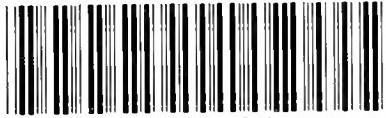


**Natural History Museum Library**



**000196231**





74-B  
**N**

No. 54

**THE LONDON  
NATURALIST**

the journal of the  
**LONDON NATURAL HISTORY SOCIETY**

**Published: September 1975**  
**Price: £1.50 post free**

# THE LONDON NATURAL HISTORY SOCIETY

WHATEVER your interest in natural history—even if you are still a beginner—the Society will welcome you as a member. You are offered a wonderful opportunity of extending your knowledge and increasing your enjoyment. The Society's Area lies within a 20-mile radius of St Paul's and here most of its activities take place. Although so much of the area is covered with bricks and mortar it is a most exciting region with an astonishing variety of fauna and flora. The Society consists of sections whose meetings are open to all members without formality. If you are interested in ARCHAEOLOGY, BOTANY, ECOLOGY, ENTOMOLOGY, GEOLOGY, MAMMALOGY, ORNITHOLOGY, RAMBLING, or if you are a young naturalist, there is a section ready to help you.

## We offer you:

### INDOOR MEETINGS

Nearly every week throughout the year with films, lectures and discussions on all aspects of natural history.

### FIELD MEETINGS

Led by experts, at weekends and on summer evenings, to visit interesting natural history places, many outside our Area. These excursions are very popular with beginners wishing to improve their knowledge.

### PUBLICATIONS

*The London Naturalist*, published annually, a permanent record of the Society's activities, including records of plants and animal life in the London Area.

*The London Bird Report*, published annually, containing papers, facts and figures of special interest to bird-watchers in London. It is compiled by the Ornithological Section. Bulletins, including the *London Natural History Society Newsletter* and the *Ornithological Bulletin* are sent to members throughout the year.

### LIBRARY

A large selection of books and periodicals is available, many with special reference to London.

### READING CIRCLES

Many important natural history journals are circulated by the sections at a fraction of the cost of the journal concerned.

### MEMBERSHIP AND SUBSCRIPTIONS

ORDINARY MEMBERS . . . . .	£2.50
JUNIOR MEMBERS . . . . .	£1.25
FAMILY MEMBERS . . . . .	£1.25

The entrance fee is £0.50. Junior membership is for persons under 18, or under 25 if receiving full-time education. Subscription rates are subject to revision from 1976. All except family members receive one free copy of *The London Naturalist* and *The London Bird Report* each year.

*Further details may be obtained from:*

**THE MEMBERSHIP SECRETARY, MRS B. F. BARRETT,  
21 GREEN WAY,  
FRINTON-ON-SEA, ESSEX, CO13 9AL**

---

### THE LONDON NATURALIST

Back numbers of *The London Naturalist* are available as follows:

No. 39 (1960) — 47 (1968); 49 (1970) — 52 (1973): £1 each post free.

No. 48 (1969): £0.50 post free. No. 53 (1974): £1.50 post free.

These, and back numbers of *The London Bird Report*, may be obtained from Mrs H. M. Housego, 110 Meadvale Road, London, W5 1LR. Reprints of the Index to *The London Naturalist 32-51* are available for £0.25 post free. Reprints of the *Annual Rainfall Overlay*, *Master Grid Overlay* and *Habitat Overlay* are £0.10 each post free.

---

# **THE LONDON NATURALIST**

**the journal of the  
LONDON NATURAL HISTORY SOCIETY**

**No. 54**  
**for the year 1974**

Edited by J. R. Laundon  
with the assistance of  
R. M. Burton and K. H. Hyatt

World List abbreviation: *Lond. Nat.*

Published September 1975  
© London Natural History Society 1975  
Printed by F. H. Brown Ltd., Sandygate Mill.  
Burnley, BB11 1RP.



# LONDON NATURAL HISTORY SOCIETY

Founded 1858

## President:

A. J. Barrett

21 Green Way, Frinton-on-Sea, Essex, CO13 9AL

## Honorary Vice-Presidents:

E. B. Bangerter, Miss E. Brown, B. Campbell, Ph.D., P. C. Holland, R. C. Homes, M.B.O.U., Eric Hosking, F.R.P.S., M.B.O.U., Rt Hon. Lord Hurcomb, G.C.B., K.B.E., Miss C. E. Longfield, F.R.G.S., F.R.E.S., M.B.O.U., E. M. Nicholson, C.B., LL.D., M.B.O.U., R. M. Payne, F.R.E.S., Mrs L. M. P. Small, H. Spooner, Prof. E. H. Warmington, M.A., F.R. Hist. S.

## Officers for 1975

**Vice-Presidents:** G. Beven, M.D., B.Sc., F.Z.S., M.B.O.U., R. E. Butler, B.Sc., F.G.S., B. L. J. Byerley, F.R.E.S., S. Cramp, B.A., F.Z.S., M.B.O.U., R. W. Hale, V. F. Hancock, M.B.O.U., K. H. Hyatt, J. E. Lousley.

**Secretary:** J. B. Cresswell, F.R.A.I., Dip.Arch., 142 Harborough Road, SW16 2XW.

**Treasurer:** D. Burchfield, 21 Severn Drive, Upminster, Essex.

**Membership Secretary:** Mrs B. F. Barrett, 21 Green Way, Frinton-on-Sea, Essex, CO13 9AL.

**Library Secretary:** Miss J. Hardy.

**Publicity Secretary:** Mrs E. Koh, 4 Church Street, Sunbury, Middlesex.

**Publication Sales Secretary:** Mrs H. M. Housego, 110 Meadvale Road, W5 1LR.

**Editor, *The London Naturalist*:** J. R. Laundon, F.M.A., 14 Victory Avenue, Morden, Surrey, SM4 6DL.

**Sub-editors, *The London Naturalist*:** R. M. Burton, B.A. (Botany), K. H. Hyatt (Zoology).

**Editor, *The London Bird Report*:** K. C. Osborne, 8 Ellice Road, Oxted, Surrey.

**Editor, *London Natural History Society Newsletter*:** A. M. Hutson, Department of Entomology, British Museum (Natural History), Cromwell Road, SW7 5BD.

**Elected Members of Council:** Miss M. P. Brown, R. M. Burton, B.A., F. M. Gauntlet, B.Sc., Miss E. M. Hillman, B.Sc., Miss A. Lightfoot, Miss J. M. Stoddart.

**Representative Members of Council:** K. A. Roberts (Nature Conservation), Miss M. E. Kennedy (Botany), Mrs A. Warren (Ecology), Miss B. Allen (G. & A.), Mrs L. Turner (Ornithology), C. F. Sayers (Ramblers and E.F.F.S.), Miss H. M. Smith (South-west Middlesex).

## Contents

Officers for 1975 ...	...	...	...	...	...	...	...	3
Report of the Society for 1974	...	...	...	...	...	...	...	5
The collections of the Natural History Museum—KEITH H. HYATT	...	...	...	...	...	...	...	6
Urban street geology in London: three temporary exposures of London Clay—K. HACKETT	...	...	...	...	...	...	...	11
Bird remains from medieval London—D. BRAMWELL	...	...	...	...	...	...	...	15
Hemiptera—Heteroptera of the London Area. Part IX— ERIC W. GROVES	...	...	...	...	...	...	...	21
The decline and reappearance of migratory fish in the tidal Thames, with particular reference to the salmon, <i>Salmo</i> <i>salar</i> —D. J. SOLOMON	...	...	...	...	...	...	...	35
Survey of Bookham Common: thirty-third year Progress report for 1974	...	...	...	...	...	...	...	38
The bryophytes of Bookham Common 1941-1967— ELLA M. HILLMAN	...	...	...	...	...	...	...	49
A new map of Bookham Common—HERBERT A. SANDFORD	...	...	...	...	...	...	...	59
Nature conservation in London 1974—KEVIN A. ROBERTS	...	...	...	...	...	...	...	61
Botanical records for 1974—J. EDWARD LOUSLEY	...	...	...	...	...	...	...	63
Mammals in the London Area 1974—K. A. J. GOLD	...	...	...	...	...	...	...	66
Book reviews	...	...	...	...	...	10, 14, 20, 48,	58	
Statement of affairs at 31 October 1974	...	...	...	...	...	...	...	70
Habitat overlay—HERBERT A. SANDFORD	...	...	...	...	...	...	...	72

## Report of the Society for 1974\*

The Society, like all bodies in this country, is being hit heavily by inflation, both directly and indirectly. We face a year of uncertainty, and there will be much introspection and reassessment taking place. The choice of the various alternatives may prove difficult to take. This must be borne bravely. We firmly believe that the Society has a great contribution to play in the search for knowledge, and our activities must reflect this duty to science as well as to our members. However, it is hoped that members will accept the challenge and continue to play their part in making this Society the important organisation that it is, and should be. The full and rich diary of events can only be justified if more people partake, and our scientific research is always in need of more workers. But let this not be a testament of pessimism, but a call to arms: you need the Society, and the Society needs you.

Membership has increased since last year in most categories, and the totals are as follows:

Ordinary members	1,068
Affiliated members	21
Senior members	25
Family members	91
Junior members	59
Honorary members	15
Life members	15
Total	1,294

We record with regret the following deaths since last year: Miss C. M. Acland, R. Fermer, Miss L. E. Griggs, C. W. Mackworth-Praed, Miss R. Marchant, M. Ogle, E. W. Pearce, P. H. Waters, and Mrs Stella Woods.

The *Programme* has continued to contain a rich variety covering all aspects of the Society's interests, thanks to the efforts of the Sectional Committees. But it is sad to note a general decrease in attendance, which threatens the quality of our events. It is a result of this latter that the Entomology Section, the descendant of the group which founded the London Natural History Society, has felt it necessary to disband and share its activities with those of the Ecology Section.

The Society's Library is now in the care of the Lyon Playfair Library at Imperial College and plans are very advanced in being able to allow access by members. Our grateful thanks are extended to Mr Whitworth, the College Librarian, and his staff, for all their help, effort, and generosity they have given to ease the work of the Library Committee. We are sad to be losing Miss Stainton as Secretary to the Library Committee, who in a year has done much to rationalise this office for her successor. Thanks are again extended to Imperial College for allowing us to use the theatres in their Botany and Zoology Departments. This useful venue has benefitted the Society.

The *Society Newsletter* has had its first year of bimonthly publication, thanks to the efforts of Mr A. Hutson, the Editor, and Miss Christine Taylor, who has spent many a long vigil at the duplicator and addressograph. It is with regret that she has left London. We shall miss her contribution, but wish her success in her new venture. The future of the *Newsletter*, however, is again threatened by lack of volunteers to operate the equipment. The publications as a whole have been rationalised by a working party, organised and chaired by Mr A. J. Barrett, in an effort to save time and money.

Recorders are anxious that more members should partake in recording the natural history of our area—especially in the plant mapping which is entering its final year.

The Treasurer, Mr A. J. Barrett, is retiring from this office after ten years of competent and active work on the Society's behalf. For this we thank him most gratefully. We are fortunate, however, in that we are not going to lose him, as he has accepted the Presidency. Finally, our thanks are extended to all Officers and Committee Members for their contributions, and to all other members and friends who, in their various ways, have assisted the Society in all its activities.

\*Presented at the Annual General Meeting, 10 December 1974.

# The Collections of the Natural History Museum

by KEITH H. HYATT\*

(*Presidential address delivered on 10 December 1974*)

The national museums and galleries house the nation's treasures, although there are additionally many items of national interest that are in private hands. Sometimes the owners loan them permanently to the relevant national collection where they are looked after, and, if necessary, exhibited to the public, or made accessible to research workers.

Last year (*Lond. Nat.* 53 : 7–16) I dealt with the events that led up to the foundation of the British Museum in 1753, the subsequent separation of the natural history collections, and the chequered story of the planning and building of the main South Kensington edifice which was opened to the public in April 1881. This year I will deal with some of the collections contained in the Natural History Museum, and their origin.

The museum's collections fall into three categories. Firstly the most obvious, the museum's *raison d'être*, the collections of animal, vegetable and mineral origin; secondly the libraries of books and journals, and thirdly the manuscripts, original drawings and paintings which are also housed in the libraries. The museum's libraries are essentially the working libraries of the scientific staff, but others may use them at the discretion of the librarians.

Books and original drawings may not, however, be removed from the museum except in special circumstances. Specimens from the scientific collections can be loaned to scientists at home and abroad for research purposes provided the potential borrower can fulfil certain requirements.

As indicated last year the collections of Sir Hans Sloane were the basis of the present natural history collections. His zoological collections have largely perished but his herbarium is well preserved, and we have his original manuscript catalogues, drawings and annotated reference books, but strange as it may seem, not his library. As it was the natural history specimens that were going to be moved from Bloomsbury to South Kensington one might be excused for assuming that the associated natural history literature would go with them, but two astonishing anomalies occurred. The first was purely physical; no space for a library had been allocated in the final plans for South Kensington. The architect's plan, approved by the trustees and by the keepers, provided departmental libraries, but as these plans developed over the years the libraries disappeared and authority was too divided to restore them. The second anomaly was the principle accepted by the trustees that no scientific literature could leave Bloomsbury because of the terms of the original trust unless countermanded by Act of Parliament. This ban included one of the most famous of all natural history libraries—that of Sir Joseph Banks—bequeathed to the nation in 1820. The law officers of the Crown, to whom the case for transferring the Banksian Library to South Kensington was referred in 1882, considered that by the Act of Incorporation the trustees of the British Museum were prohibited from removing the Banksian Library to South Kensington. And naturally this ban included the library of Sir Hans Sloane, although certain reference volumes just referred to were allowed to go as they had a direct bearing on his collections.

When the natural history collections moved to South Kensington in 1881 the number of books which accompanied them and were the foundation of the library there was very small indeed. A mere 1,872 titles of books and 140 separate periodicals in the Zoology Department and 1,129 books and 48 periodicals in the Mineral Department are recorded. So you will see that the Natural History Museum had to start almost from scratch. After a lot of pressure from Albert Günther, Keeper of Zoology from 1875 to 1895, the Treasury sanctioned grants

\* Department of Zoology, British Museum (Natural History), Cromwell Road, London SW7 5BD.

for the purchase of books, and for the six-year period 1879 to 1885 £30,700 was provided. The trustees had decided that a General Library, which should hold works common to more than one department, should be formed, and B. B. Woodward was appointed Librarian. He already held office in the Department of Printed Books at Bloomsbury. Woodward enlisted the help of Messrs Dulau and Co., an old established firm of antiquarian booksellers, and the markets of Europe were combed for secondhand copies of basic works.

The first twenty years of the libraries' growth were critical and in 1900 a census revealed the following: General Library 19,395 volumes and 5,569 sheets of maps, Botany 14,980 volumes, Geology 9,395 volumes, Mineralogy 6,339 volumes, and Zoology 17,167 volumes. When B. B. Woodward retired in 1920 he had the satisfaction of knowing that during his forty years' service at South Kensington the libraries had grown into one of the most important collections of natural history books in the world. The current estimate for the museum's libraries is a total of 450,000 volumes, and this, despite the fact that it does not enjoy privileges under the Copyright Acts. It is largely through the generosity of past members of staff and numerous members of the public that the libraries have risen to their present importance. The runs of journals are rather different. They are acquired as and when published. The 1968 *List of Serial Publications in the British Museum (Natural History) Library* comprises some 12,500 titles of journals available in the museum.

As stated above the libraries are essentially the working libraries of the staff. It is impossible to carry out systematic research into natural history at any level without recourse to the literature. "Have you seen all the literature?", "What references are there?", or "What does the author say in his original description?", are phrases echoed throughout the museum or any other place where systematics and identification are carried out. Even the humblest of amateur beginners must have some literature before he can do identification or classification with any degree of certainty.

*The History of the Collections Contained in the Natural History Departments of the British Museum* was published over sixty years ago, but it does cover the period that saw the big expeditions and explorations, and the acquisition of many outstanding large private collections that are the foundation of taxonomic research.

First and foremost after Sloane's collection come the celebrated botanical collections of Sir Joseph Banks which the trustees acquired in 1827. Amongst Banks's treasures are many works based on the three celebrated voyages of Captain James Cook. Charles Darwin's famous voyage on the *Beagle* is of course represented in the museum, not so much by specimens but by manuscripts on reptiles, amphibians and cirripedes. The equally famous scientific expedition of *HMS Challenger* from 1873 to 1876, with its reports by Sir John Murray and others, was the basis of a recent large exhibition in the museum. Complementary to this is Murray's own zoological and oceanographical library which was presented by his son in 1921. Whilst on sea voyages I will mention in passing the 1901 to 1904 log-books of the Antarctic Exploring Vessel *SS Discovery*. The name *Discovery* has been perpetuated by two more vessels of that name, whilst the Whale Research Unit of the Institute of Oceanographic Sciences is still popularly known as "Discovery Investigations".

These early and historical voyages of exploration are known to all, but the large collections of specimens that have become virtual springboards for the systematics of the many groups are not widely known outside of natural history circles, or indeed outside the individual groups themselves. It is fair to say that most sections in the museum owe much to the inheritance of very large collections of British or foreign specimens. I will now enumerate some of the major and more notable acquisitions by which the libraries and collections have been enriched.

All ornithologists have heard of the Tweeddale Library. This magnificent array of 2,560 volumes was amassed by Arthur Hay, ninth Marquis Tweeddale, who,

until his death in 1878, wrote prolifically on birds, mainly from the Indian sub-continent. The next major acquisition was in 1901 when Thomas de Grey, sixth Baron Walsingham, presented his collection of 200,000 specimens of micro-lepidoptera and his library of associated books which comprised more than 1,000 magnificently bound volumes. In 1905 the Alexander Fry bequest was received. Fry was a coleopterist and he augmented his own material by large purchases of important valuable collections. His library comprised 611 volumes. In 1908 the bibliographer C. D. Sherborn, known to museum colleagues as "Squire", and who compiled the famous *Index Animalium*, presented to the General Library a collection of handwriting specimens of naturalists. This comprised some 8,000 letters and other documents. The identification of handwriting is often a necessary and valuable part of the practical processes of systematics as practiced in museum work. In 1910 Dr Albert Günther, the former Keeper of Zoology mentioned earlier, presented 146 folios of drawings of Chinese fishes made by native artists in the early nineteenth century. The Botanical Library was enriched in 1913 by the acquisition of 11,325 plates and original drawings of plants collected by Isaac Swainson during his lifetime from 1746 to 1812, and in the same year four volumes of original drawings made for Pieter Cramer's *Papillons Exotiques* were purchased for the Entomological Department. In 1915 were presented the personal works and memoirs of Sir Richard Owen, one of the principal personalities in the foundation of the museum, and its first Director.

I have already mentioned Sir John Murray's library received in 1921. A second important collection was received the same year, the ornithological library of Captain G. E. Shelley, which included the pattern plates for his monograph of the sun-birds. In 1925 three major acquisitions came to the museum—the Heron-Allen library of works relating to the Foraminifera and comprising 719 volumes; one hundred bound volumes of works on the Porifera from Professor Arthur Dendy; and a set of 154 original zoological and botanical drawings painted in Ceylon and the Malay Archipelago by Pieter Cornelius de Bevere during the years 1754 to 1757.

It was in 1937 that the most extensive and valuable single library to be acquired was bequeathed to the museum. Lionel Walter, the second Baron Rothschild, had founded a zoology museum at Tring in Hertfordshire. It contained the largest collection of animals ever assembled by one man. The library comprised almost 30,000 volumes, all superbly bound, and relating mainly to ornithology and entomology. As mentioned last year the Tring Museum has been enlarged and now houses the entire ornithological collections and staff, whilst the entomological collections from there are now incorporated with those at South Kensington. The second largest bequest was in 1948 when the former Director, Sir Sidney Harmer, presented his extensive library on two rather widely differing marine groups, the Cetacea and the Polyzoa.

Scarcely a year passes without some rare or unique works being acquired. In 1964 the Trechmann bequest of 242 bound volumes and a large collection of reprints, mainly concerned with the palaeontology of the West Indies, was received, and the following year a collection relating to mineralogy, and containing some rare works not in the museum, was bequeathed by Sir Arthur Russell. One of the most recent bequests is the library of the internationally well known ornithologist Colonel Richard Meinertzhagen, which comprised 367 volumes of works and a large collection of reprints.

So far I have given you some idea of the magnificent way in which the national collections, but more especially the libraries, have been enriched. Systematic research in the museum is based naturally enough on having the specimens available, but despite the bequests vast gaps still exist in our knowledge as many corners of the earth are still unworked. We rely very heavily on monographs that have been prepared in conjunction with collections which may be derived from widely differing sources. Many of these monographs were prepared around the turn of the century. The *Fauna of British India* series is scant in its coverage of some

groups, but the birds for instance, were well documented, and *Fauna Hawaïensis*, sponsored by a joint committee of the Royal Society and the British Association, does similarly for the Sandwich Islands. The massive *Biologia Centrali-Americanana* is supported by an enormous amount of type material. Additional to monographs are the results of expeditions sponsored by a committee like the West Indian Exploration Committee at the end of last century, or by the museum itself, which has had expeditions to Ruwenzori in East Africa, Arabia, Nepal, the Solomon Islands, and Australia, to quote but a few. Members of the staff have also accompanied expeditions that are primarily of a different discipline from biology, for example mountaineering and surveying, and by this means very valuable collections have been acquired. These expeditions' results are either published in scattered journals depending on the choice of the individual specialists working on the material, or are brought together as a series in one journal.

There have also been, mainly in the past, a fair quota of "resident" collectors, either paid or unpaid, who have worked for the museum. Two of the foremost of these were Frank Kingdon Ward and Frank Ludlow whose plant collections from the Himalayas and Tibet are second to none. Kingdon Ward wrote a fine series of travel books with romantic titles such as *The Land of the Blue Poppy* in 1913, *Plant Hunter's Paradise* in 1937, and *Return to the Irrawaddy* in 1956, to quote but three. Ludlow's travels in Tibet, Bhutan, Sikkim and Turkestan spanned forty years, and he spent the last twenty-three years of his life working in the museum's herbarium. In my own group, the Arachnida, three men in particular have done more to enrich our collections from southern and central Africa than any other source—G. L. Bates, J. ff. Darling and Sir Guy Marshall.

The first collections in good state of preservation to be received from Brazil were made by E. E. Austen and F. O. Pickard-Cambridge when they accompanied Messrs Siemens' cable-laying ship the *SS Faraday*. Some of the collectors, like H. W. Bates, author of *The Naturalist on the River Amazons*, had his collections shipped home by instalments and sold in London. Many museum specimens were acquired at auctions and sale-rooms.

Two famous collections from the Indian subcontinent have been made by persons on official duty. Brian Houghton Hodgson, diplomat, orientalist and antiquarian, who was British Resident at Kathmandu from 1820 to 1843, has been described as one of the greatest and least thanked of all our residents, and one of the greatest labourers in the sphere of Indian research and record. He made large zoological collections in Nepal and supplemented these with water-colour drawings by native artists. The drawings number 1,319 in seven volumes. The second person, Allan Octavian Hume, Commissioner of Customs and a Secretary to the Government of India, whose collection of about 82,000 birds and eggs made between 1862 and 1885 from all parts of the Indian Empire, including the Andaman and Nicobar Islands, is the largest and one of the most splendid donations ever made to the Museum. Hume, incidentally, was the founder of the Indian National Congress and the South London Botanical Institute.

Three famous mountaineers have collected for the museum, not in large quantities, but material from scientifically interesting and remote areas not readily accessible to other collectors—Edward Whymper in the Andes, Eric Shipton from Patagonia, and Major R. W. G. Hingston, author of the classic *A Naturalist in Himalaya*, from the Everest region.

Finally, in the Arachnida again, Count Eugen Keyserling's important collection of nearly 10,000 specimens of over 2,000 named species of American and Australian origin; the Nuttall collection of ticks, of outstanding medical and taxonomic importance, presented by the Molteno Institute at Cambridge in 1939; the famous collection of mainly British spiders of A. Randell Jackson which was received in the 1940s; and lastly, the only large single collections of British mites ever privately amassed—those of A. D. Michael and of Soar and Williamson—which formed the basis of Ray Society monographs.

One should not be misled into thinking that only large collections are of interest. Any one can present material to the national collections where it will be curated for posterity and assured a more useful existence than if left uncared for by unsympathetic relatives. Two instances of the latter have occurred in the Arachnida in recent years. The collections of J. N. Halbert in Ireland and the Rev. J. E. Hull in Northumberland were both "lost" to science until it was discovered that a man in Killarney had custody of much of Halbert's specimens in his leaking attic, and part of Hull's collections were discovered dried out in Colchester Museum. Both contained type material and much has been saved.

---

## Book Review

*Epping Forest: Its History and Wildlife.* By Alfred Leutscher. 203 pages including 12 pages of plates, 2 text figs. David & Charles, Newton Abbot. 1974. £4·95.

Obviously written with a deep love of Epping Forest and a keen awareness of the dangers which threaten it today, this is the first attempt since Edward North Buxton's classic guide of 1884 to provide a comprehensive account of its history and wildlife. Ranging widely from geology and prehistory to modern management and conservation, it contains much useful information; unfortunately it also includes some remarkable errors, which may well mislead the unsuspecting reader. The legend that Boadicea fought her last battle in the Forest is repeated here, despite all the evidence of modern scholarship; the geological nomenclature, by ignoring the Claygate Beds, follows a system superseded in 1912; the Pebble Gravel is erroneously described as Westleton Shingle; the height of High Beach is given as "some 500 ft" whereas it is only 350 ft. Some errors, such as giving as present species that are extinct or listing as extinct others that have returned, are perhaps explained by the inevitable time-lag between writing and publication. Errors of location, however, are especially unfortunate, such as giving the position of Cuckoo Pits as in St Thomas' Quarters, two miles north of their actual situation.

In all this is a disappointing book. Epping Forest is truly a precious heritage, both as a place of recreation and for its scientific interest: one cannot help feeling that it deserves better than this.

*Habitat* 11(2): 7 (1975)

# Urban Street Geology in London: Three Temporary Exposures of London Clay

by K. HACKETT\*

## Introduction

A few years ago a paper describing eight temporary and two semi-permanent exposures of London Clay was published by Rundle & Cooper (1970). It used as its basis a standardised temporary exposure recording form, copies of which can be obtained from Mr J. Cooper, 4 Yewdale Close, Bromley, Kent. The necessity of recording full details of temporary exposures at every possible occasion, and the methods used to examine them, are given by Rundle & Cooper (1970). Descriptions of three temporary exposures are included below. The range of each species through the five divisions of the London Clay (Wrigley 1924, 1940; Rundle & Cooper 1970) is given, and an estimate of the relative abundance of each species is made; where there is no estimate the species is represented by a single specimen. All weights are for dry clay.

The details of the Green Park site were used in a Tertiary Research Group exhibit at the meeting of Geological Societies of the British Isles, Manchester University, in September 1973, and at the 1973 Geologists' Association Annual Reunion. The exhibit was entitled "Urban Street Geology".

## The Sites

### 1. Green Park, City of Westminster.

**LOCALITY:** Vertical shaft with tube tunnels at its base, behind Green Park Underground Station within Green Park, Piccadilly, London W1.

**GRID REFERENCE:** TQ 29018026. **HEIGHT (O.D.):** 53 ft.

**PURPOSE OF SITE:** Underground train tunnels for the new Fleet line.

**CONTRACTORS:** Waddington & Son.

**REPORTED BY:** C. P. Nuttall (14 July 1972).

**COLLECTORS:** K. Hackett (16 July 1972); J. P. James and K. Hackett (23 July 1972).

**LITHOLOGY OF THE LONDON CLAY:** Very brown clay with glauconitic patches; common septarian nodules and pyrite concretions.

**SECTION:** No section was seen. The clay was collected from tips and said by workmen to be coming from approximately 105 feet below ground level.

**BIOTIC LIST:** Based almost entirely on the contents of a 61·55 kg sample sieved to 20 mesh, about 10 kg were further sieved to 30 mesh.

#### PLANTAE

Indeterminate wood fragments (2-5) Common  
Indeterminate seed (2-5)

#### PROTOZOA

Undetermined Foraminifera (1-5) Common below 20 mesh

#### COELENTERATA

*Graphularia wetherelli* Edw. & Haime (2-5) Common  
*Stephanophyllia discoides* Edw. & Haime (2-3)

\* 33 Oppidans Road, Chalk Farm, London NW3 3AG.

**BIVALVIA**

- Abra splendens* (J. de C. Sowerby) (2-5)  
 Indeterminate teredenid tubes (2-5) Scarce  
 ? *Nuculana* sp. (2-5)  
*Thyasira angulata* (J. Sowerby) (2-3)

**GASTROPODA**

- Indeterminate pyrite cast (2-5)

**CEPHALOPODA**

- Indeterminate nautiloid (2-5)

**SCAPHOPODA**

- Antalis anceps* (J. de C. Sowerby) (2-3)  
*Laevidentalium nitens* (J. Sowerby) (2-5)  
 Indeterminate pyrite casts (2-5) Scarce

**ANNELIDA**

- Ditrupa plana* (J. Sowerby) (2-5) Common

**ARTHROPODA**

- Indeterminate crab claws (2-5) Scarce

**ECHINODERMATA**

- Democrinus londinensis* (Forbes) (2-3)  
*Isselicrinus subbasaltiformis* (Miller) (2) Common

**PISCES**

- Brosmophycis sagittalis* (Frost) (2-5)  
*Dinematicichthys argutus* Stinton (2-5)  
*Scyliorhinus minutissimus* (Winkler) (2-5)  
 Indeterminate teleost remains (2-5) Common  
 Indeterminate otolith (2-5)

The macrofossil assemblage is characteristic of the Lower London Clay of the London Area; division 2 of Wrigley (1924, 1940). The biota and associated nodules and concretions are probably indicative of a level between 90 and 110 feet above the base of the London Clay in London. The London Clay and Made Ground at this site must therefore be a total of about 200 feet thick.

## 2. University, London Borough of Camden.

**LOCALITY:** South end of site of the new building for the Institutes of Education and Law and the extension to the school of Oriental and African Studies, University of London, Russell Square, London WC1.

**GRID REFERENCE:** TQ 298822. **HEIGHT (O.D.):** 84 ft.

**PURPOSE OF SITE:** Foundations of building.

**CONTRACTORS:** Higgs and Hill.

**REPORTED BY:** D. Sealy (26 May 1971).

**COLLECTORS:** D. Ward and K. Hackett (2 June 1971).

**LITHOLOGY OF THE LONDON CLAY:** Stiff blue clay with large nodules.

**SECTION:** Gravel and Made Ground..... 20 ft.

Iron pan .....

Unweathered London Clay..... seen to 6 ft.

**BIOTIC LIST:** Based entirely on the contents of a 16 kg sample sieved to 20 mesh only.

**PLANTAE**

- Indeterminate wood fragments (2-5) Common

**BRACHIOPODA***Lingula tenuis* J. Sowerby**BIVALVIA***Thyasira goodalli* (J. de C. Sowerby)**GASTROPODA***Cyllichna* sp. (2–5)*Euspira glauconoides* (J. Sowerby) (2–5) Scarce*Orthochetus elongatus* Wrigley (2–4) Scarce? *Streptolathyrus cymatodis* (Edwards) (2–3)

Indeterminate pyrite casts (2–5) Common

**PTEROPODA***Spiratella taylori* Curry (2–5)**SCAPHOPODA**

Indeterminate fragments (2–5) Rare

**PISCES**

Indeterminate teleost bones (2–5) Scarce

*Centropomus excavatus* Stinton (2–4)

The macrofauna contains a small number of species mostly represented by single specimens; this impoverished fauna, although undiagnostic, is typical of lower Division 2; similar to that exposed at Bessborough Gardens, SW1 (Rundle & Cooper 1970). The London Clay basement at this site is probably about 80 feet below ground level.

### 3. Archway Station Forecourt, London Borough of Islington

**LOCALITY:** Shaft and tunnel below Archway Station forecourt at the junction of Junction Road and Highgate Hill, London N19.

**GRID REFERENCE:** TQ 293868. **HEIGHT (O.D.):** 188 ft.

**PURPOSE OF SITE:** Underground working on Archway (Northern Line) Station.

**CONTRACTORS:** McGee.

**REPORTED BY:** K. Hackett (5 July 1972).

**COLLECTORS:** K. Hackett (7 July, 10 July 1972).

**LITHOLOGY OF THE LONDON CLAY:** Grey-blue clay with pyrite streakings.

**SECTION:** No section was seen. The clay was said to be coming from approximately 60 feet below ground level.

**BIOTIC LIST:** Based on a 30·4 kg sample sieved to 20 mesh; about 10 kg was further sieved to 30 mesh.

**PLANTAE**

Indeterminate wood fragments (2–5) Common

**PROTOZOA**

Undetermined Foraminifera (1–5) Common below 20 mesh

**COELENTERATA***Graphularia wetherelli* Edw. & Haime (2–5) Scarce**BIVALVIA***Nucula* sp. (2–5)*Pecten duplicatus* J. de C. Sowerby (2–3)

Teredinid tubes (2–5) Scarce

**GASTROPODA***Euspira glauconoides* (J. Sowerby) (2–5) Scarce*Ficus (Priscoficus) ? multiformis* Wrigley (3–5)*Streptolathyrus cymatodis* (Edwards) (2–3)

Indeterminate pyrite casts (2–5) Common

**SCAPHOPODA**

*Antalis anceps* (J. de C. Sowerby) (2-3)  
Indeterminate pyrite casts (2-5) Common

**ANNELIDA**

*Ditrupa plana* (J. Sowerby) (2-5) Common  
? *Sclerostyla* sp. A fragment of a small tube

**PISCES**

*Microgadus eocenicus* (Frost) (2-4)  
*Palaeogadus serratus* Stinton (2-5)  
*Scyliorhinus minutissimus* (Winkler) (2-5)  
Indeterminate teleost bones (2-5) Common

This site is close to that of Highgate Archway; the clay at Highgate Archway was thought by Bromehead (1925) to be a total of about 340 feet thick. The difference in heights between Highgate Archway and Archway Station Forecourt is about 140 feet and therefore the clay from the Archway Station Forecourt must come from around the boundary of divisions 2 and 3 of Wrigley (1924, 1940). The fauna is indicative of about this level. Unfortunately the thickness of London Clay cannot be accurately worked out as Bromehead (1925) is vague about the position of the specimens at Highgate Archway, and no account is taken of any dips.

I would like to thank those who reported and collected from the three sites described, and all those who have helped me in the past. Especial thanks are extended to Mr. John Cooper for his help and for his reading of the manuscript.

**REFERENCES**

- BROMEHEAD, C. E. N. 1925. The geology of north London. Explanation of sheet 256. *Mem. geol. Surv. U.K.* 1-63+VII.
- RUNDLE, A. J. & COOPER, J. 1970. Some recent temporary exposures of London Clay in the London Area. *Lond. Nat.* 49 : 113-124.
- WRIGLEY, A. 1924. Faunal divisions of the London Clay, illustrated by some exposures near London. *Proc. Geol. Ass.* 35 : 245-259.
- WRIGLEY, A. 1940. The faunal succession in the London Clay, illustrated in some new exposures near London. *Proc. Geol. Ass.* 51 : 230-245.

**Book Review**

*Drawings of British Plants* 31. By Stella Ross-Craig. 46 plates of line drawings. G. Bell & Sons, London. 1974. £2.

The final part of this fine work with drawings of the British flora will be received with delight. Many of the plates are amongst the best in the whole series, and those of *Potamogeton*, *Zostera* and *Najas* are fine examples of the precision in detail of the work of one of our leading botanical artists. It is for this that the book should be purchased as an essential reference book by every library.

This part, with the separately bound index, completes the work which started publication in 1948. The cost has risen to over six times that of the first part of 44 plates. The sequence used in botanical works has changed considerably, additional species have been recognized or discovered. The Cyperaceae and Gramineae have been omitted, and with other species left out, the work is very incomplete. Although the detail is superb, the general picture of any plant larger than a herbarium sheet is liable to be misleading—for random examples compare the Cruciferae in part 3 (Plates 38, 47, 74) or some of the docks in part 26 (Plates 22, 24). Printed mainly on only one side of heavy paper the series is bulky, taking up a foot of valuable shelf space, and expensive—purchased bound it costs £62·50. Much as it is recommended for large libraries, it falls short of the requirements of amateur botanists.

# Bird Remains from Medieval London

by D. BRAMWELL\*

During 1972 and 1973 Dr Peter Marsden of The Guildhall Museum directed archaeological excavations at the site of Baynard's Castle, at the west end of Thames Street, City of London. I was responsible for the identification of the bones of birds recovered during the excavation. An impressive range of species was found to be present, sufficient to provide a general picture of bird life in and around the City in medieval times, as well as some indication of the sports of cock-fighting and falconry and of the species preferred for food. Bell (1922) lists a number of birds from "early ground near London Wall", but this description is too vague to merit any comparison. The present list (Table 1) is compiled from reliably-dated material under the groups: c. 1350, 1500 and 1520.

TABLE 1. *Baynard's Castle excavations.* Numbers of bird bones recovered grouped under species.

	Archaeological group: c. 1350	1500	1520	Totals
<i>Gavia arctica</i> (L.)				
Black-throated diver			1	1
<i>Puffinus puffinus</i> (Brünnich)				
Manx shearwater			1	1
<i>Phalacrocorax carbo</i> (L.)				
Cormorant		4	1	5
<i>Botaurus stellaris</i> (L.)				
Bittern			6	6
<i>Ardea cinerea</i> L.				
Grey heron		2	11	13
<i>Cygnus olor</i> (Gmelin)				
Mute swan	10	6	6	22
<i>Anser anser</i> (L.) var.				
Domestic goose	205	627	208	1,040
<i>Anas platyrhynchos</i> L.				
Mallard		3	9	12
<i>A. platyrhynchos</i> var.				
Domestic duck	32	102	29	163
<i>A. crecca</i> L.				
Teal	4	24	11	39
<i>A. strepera</i> L.				
Gadwall			3	3
<i>A. penelope</i> L.				
Wigeon	3	1	3	7
<i>A. acuta</i> L./ <i>platyrhynchos</i> L.				
Pintail/Mallard	4	16	11	31
<i>A. querquedula</i> L.				
Garganey		?3	?1	4
<i>Spatula clypeata</i> (L.)				
Shoveler		?1	1	2
<i>Aythya ferina</i> (L.)				
Pochard		?5	?3	8
<i>Bucephala clangula</i> (L.)				
Goldeneye	5		4	9

\*Fulwood, Baslow Road, Bakewell, Derbyshire DE4 1AA.

Archaeological group: c. 1350	1500	1520	Totals
<i>Mergus serrator</i> L.			
Red-breasted merganser		1	1
<i>M. merganser</i> L.			
Goosander	8		8
<i>Anatidae</i> indet.			
Ducks, indeterminate	3	2	5
<i>Milvus milvus</i> (L.)			
Red kite	2	2	4
<i>Accipiter nisus</i> (L.)			
Sparrowhawk	1		1
<i>Falco peregrinus</i> Tunstall			
Peregrine	1		1
<i>Perdix perdix</i> (L.)			
Partridge	16	49	33
<i>Coturnix coturnix</i> (L.)			
Quail	2	2	4
<i>Phasianus colchicus</i> L.			
Pheasant		4	4
<i>Pavo cristatus</i> L.			
Peafowl		3	3
<i>Gallus gallus</i> (L.)			
Domestic fowl	419	1,815	612
<i>Grus grus</i> (L.)			
Crane		1	3
<i>Crex crex</i> (L.)			
Corncrake		2	2
<i>Fulica atra</i> L.			
Coot		2	2
<i>Otis tarda</i> (L.)			
Great bustard		1	1
<i>Pluvialis apricaria</i> (L.)			
Golden plover	1	17	18
<i>P. squatarola</i> (L.)			
Grey plover	?1	?1	2
<i>Vanellus vanellus</i> (L.)			
Lapwing	?1		1
<i>Arenaria interpres</i> (L.)			
Turnstone	1	1	2
<i>Calidris alpina</i> (L.)			
Dunlin		1	1
<i>C. canutus</i> (L.)			
Knot		4	4
<i>Tringa erythropus</i> (Pallas)			
Spotted redshank	?2		2
<i>T. totanus</i> (L.)			
Redshank		3	3
<i>T. nebularia</i> (Gunnerus)			
Greenshank	?1	4	5
<i>T. ochropus</i> (L.)			
Green sandpiper		1	1

Archaeological group:	c. 1350	1500	1520	Totals
<i>Limosa lapponica</i> (L.)				
Bar-tailed godwit			3	3
<i>Numenius arquata</i> (L.)				
Curlew		1	6	7
<i>Scolopax rusticola</i> L.				
Woodcock	5	12	19	36
<i>Gallinago gallinago</i> (L.)				
Snipe	3	6	5	14
<i>Larus minutus</i> Pallas				
Little gull		?1		1
<i>L. ridibundus</i> L.				
Black-headed gull		1		1
<i>Sterna sandvicensis</i> Latham				
Sandwich tern			1	1
<i>Sterna</i> sp.				
Common/Arctic tern size		?1	1	2
<i>Columba palumbus</i> L.				
Woodpigeon	1	9	?1	11
<i>C. oenas</i> L.				
Stock dove	6	?8	?3	17
<i>C. livia</i> Gmelin				
Rock/domestic dove		16		16
<i>Alauda arvensis</i> L.				
Skylark	1		1	2
<i>Turdus merula</i> L.				
Blackbird		?2	2	4
<i>T. pilaris</i> L.				
Fieldfare	1	?2		3
<i>T. philomelos</i> Brehm				
Song thrush	1	?2		3
<i>Fringilla montifringilla</i> L.				
Brambling	1			1
<i>Corvus monedula</i> L.				
Jackdaw	1	9		10
<i>Corvus</i> sp.				
Rook/Crow		1		1
			grand total	4,522

The castle, with its dock and waterfront, are shown on London's earliest accurate picture map in the *Civitates Orbis Terrarum* of 1572 (Holmes 1969). The map shows the small size of the City, approximately a square mile, with Westminster as a separate city. There are numerous fields and some marshy areas, e.g. Lambeth Marsh on the South Bank and Moorfields, described by Fitter (1945) as "the great stagnant fen that lay on the north side of the City wall". The Fleet ditch and Walbrook are described by the same author as "insanitary" but would no doubt be attractive to some of the small waders. Other habitats suited to birds on the list include woodland, scrub, parkland, pasture and crops, reed-beds and open downland, apart from the river itself. Of the birds listed 62 per cent are species frequenting river and riverside habitats.

The domestic birds include a large number of geese, most of which were no doubt fattened on the open-fields, while some of the duck bones, although still retaining the characters of mallard, are larger and stouter than the bones of that species, and can be referred to a domestic strain. Peafowl were evidently un-

common and besides their appearance at banquets were probably of prestige value in the gardens of important town residences. Domestic doves appear to have been kept and eaten in the "squab" (immature) stage, when they are particularly succulent. Hedley (1972) mentions that Henry II's falcons were fed on pork, chickens and doves. Pheasants were evidently feral by late medieval times as they are described by Fitter as being birds of the warrens (Fitter 1945). One of the tarsal bones found was small by present day standards and may indicate that birds of different races were then present. Swan is assumed to have been semi-domestic and is often quoted in menus at Christian festivals. It was sold in 1328 for £0·25 (5/-) (Fitter 1945). The bones of domestic fowl yielded some interesting features, notably cock tarsal bones in the 1350 and 1500 groups in which the spurs had been pared with a knife. This appears to have been in preparation for fitting of metal spurs preparatory to a contest. Some other tarsal bones exhibited the five toes (1350 and 1520 groups), a feature of the present day Dorking and Poland breeds.

The majority of the species found at the site had evidently been eaten by town or castle folk, the chief exceptions being the birds of prey. Two of the latter, sparrowhawk and peregrine falcon would have been used in hunting, while red kite may have been destroyed because of its depredations among poultry chicks. The bones of red kite *Milvus milvus* are to be expected in any extensive excavation of a medieval town or castle, though there were times when the bird was afforded protection for its useful work as a city scavenger (Newton & Gadow 1893–1896). Fisher (1966) suggests that the scavenging kites of medieval London might have been *M. migrans*, the black kite, but I have now had a number of occurrences of kite, from Neolithic to later times (Table 2) and all are undoubtedly *M. milvus*. Reference material used comprised a European specimen of red kite and an Ethiopian one of black kite. The table shows that the British bones are all larger than the comparable bone of the black kite. It can be said that *M. milvus* is generally more robust throughout its skeleton; the measurements given by Witherby *et al.* (1939) also confirm this, by 8 per cent in the tarsus (with some overlap in size range) and by 11–13 per cent in its wing (with no overlap). Bell (1915) also names red kite specifically from Glastonbury Lake Village, though his record from Withernsea, Yorkshire (Bell 1922) was identified as "kite sp." The raven was also identified from the castle but insecurely dated, so has been omitted from Table 1. This bird was likewise given protection.

TABLE 2. The occurrences of red kite *Milvus milvus* (L.) from archaeological sites in Britain. The author is responsible for the identifications apart from the Durrington Walls specimen, for which Mr G. S. Cowles takes credit. The measurements in mm refer to total lengths except where indicated. Comparable measurements of an Ethiopian black kite *M. migrans* (Bodd.) are given where appropriate.

Site and age	Bone, <i>M. milvus</i>	Bone, <i>M. migrans</i>
Durrington Walls, Wilts. (Neolithic)		
Caerwent (Roman)	l. carpometacarpus 68 r. humerus 124 r. ulna 142 r. carpometacarpus 72 r. femur 67·8 synsacrum (midline) 54 (max. dorsal width) 44	65 113·5 131 65 62 47 37
North Elmham, Norfolk (Saxon)	r. tibiotarsus (distal width) 11·8 r. humerus shaft (max. diameter) 8·3	10·5 7·3
Bristol Castle (medieval)	r. carpometacarpus 72·8	65
Baynard's Castle (medieval)	l. ulna 147 r. tibiotarsus 87·5 l. ulna (distal width) 11·8	131 79 9·3

The most interesting wild species recovered from the 1520 refuse is the great bustard, which must have been obtained well outside the urban area, possibly from the Sussex Downs or the Chilterns, where wide areas of open chalk uplands would have provided the required habitat. Gilbert White (1789) says "there are bustards on the wide downs near Brighthelmstone", though he fails to state the species. From this record one can hardly expect the bird to have been scarce in medieval times. The femur of a male bird from within the castle boundary appears to be the only well-dated record for a sub-fossil bone of the bird in the British Isles. Bell (1915 : 409) mentions "a doubtful find in Norfolk peat" and there is also a doubtful record from the Pleistocene from a Mendip cave (Newton 1924), but the published list of species includes tundra and temperate forms side by side and so is not helpful.

The bustard was no doubt the centre-piece at some castle banquet and induces speculation as to the way in which it was killed. The bird was an adult and a strong flier, but younger birds are said to have been run down by men on horseback, aided by greyhounds (Savory 1971). So far there are no records of great bustard from archaeological sites of Roman, Saxon or Norman age, though some excavations have taken place in ancient strongholds of the bird, e.g. Thetford and North Elmham, both in Norfolk (Clutton-Brock, in press; Wade-Martins, in press). The evidence, therefore, does tend to support the contention of Vesey Fitzgerald (1969) that the British birds represented an extension of their range by continental birds, perhaps during the earlier part of the 15th century, in which event the colonies are likely to have been very strong by 1520. Changes in land usage, agricultural progress, collecting skins and eggs, and use as food appear to be factors contributing to the extermination of the species about 1838 (Newton & Gadow 1893–1896). Since that time stragglers have appeared at intervals of several years, mainly during the winter.

Another fine former breeding bird, the crane, also a favourite item at great banquets, has had a longer history in this country as the bones occur in sites from prehistoric times to about the 17th century. The loss of this bird as a breeding species was without doubt due to the draining of the extensive tracts of fen and marshy areas to make the ground available for agriculture. Two other marsh birds, bittern and heron, were also much esteemed as food and, along with swan and other birds, could be bought ready roasted in medieval London (Fitter 1945). The present wintering of many species of ducks, gulls and waders along the Thames is shown by the Baynard's Castle list to be only a return to a former traditional pattern. Identification of some of these species is difficult from the bones and there may be a few errors where species overlap in size and form, pintail and mallard, teal and garganey, for example, could be wrongly placed.

The most popular land game-bird proves to have been partridge, whilst plover species came a good second. Woodcock and snipe were taken, the four birds having proved popular from Palaeolithic times to the present, with the Romans showing the greatest ability in hunting them (Bramwell, based on many identifications in recent years). The smaller birds, such as thrushes, larks and finches could have been taken by sparrowhawks or by snaring. The presence of manx shearwater may seem unusual but I have identified the same species from food refuse obtained in excavations at Bristol Castle (unpublished). The cormorant is not unexpected among food bones as it also appears in most Scottish prehistoric sites, from Neolithic to Iron Age times (Bramwell unpublished). Mallard and teal as food have, with few exceptions, always proved the most exploited of the ducks and the quantities brought in for some banquets seem to demand the use of decoy ponds.

Of land birds, quail is seldom found in medieval contexts, but the small size of the bones has probably caused it to have been overlooked at some excavations. Corncrake, partridge, skylark, quail and plover are indicators of both dry and moist meadow and probably some crops in the London environs. Both corncrake and quail seem to be seldom mentioned in the records of banquets and market-prices of medieval times. The relative abundance of woodpigeon, stockdove and jackdaw are indicative of woodland or parkland within easy reach of London.

The species list as a whole includes residents, passage migrants and both summer and winter immigrants, suggesting that bird hunting extended from autumn, through winter, to late spring. In the absence of records to the effect, I assume that a close season was observed.

In conclusion I wish to acknowledge the help received from the following: Dr Marsden for permission to publish the material and to make use of his notes regarding the periods involved, Dr P. Morris for providing the black kite specimen, Mrs N. Brayley for typing, and Dr D. Yalden for advice on the script. Mr G. S. Cowles, of the British Museum (Natural History) kindly advised on some difficult specimens.

#### REFERENCES

- BELL, A. 1915. Pleistocene and later bird fauna of Great Britain and Ireland. *Zoologist* IV, 19: 401-412.
- BELL, A. 1922. Pleistocene and later birds of Great Britain and Ireland. *Naturalist, Hull* 787-788: 251-253.
- BRAMWELL, D. 1971. In WAINWRIGHT, G. J. & LONGWORTH, I. H. 1971. Durrington Walls 1966-1968. Appendix 2: animal bones. *Rep. Res. Comm. Soc. Antiquaries, Lond.* 29: 338-350.
- CLUTTON-BROCK, J. (in press) The animal resources of Saxon England. In WILSON, D. (Editor) *Anglo-Saxon Archaeology*. Methuen, London.
- FISHER, J. 1966. *The Shell Bird Book*. Ebury, London.
- FITTER, R. S. R. 1945. *London's Natural History*. Collins, London.
- HEDLEY, O. 1972. *Royal Palaces*. Hale, London.
- HOLMES, M. 1969. *Elizabethan London*. Cassell, London.
- NEWTON, A. & GADOW, H. 1893-1896. *A Dictionary of Birds*. Black, London.
- NEWTON, E. T. 1924. Note on additional species of birds from Aveline's Hole. *Proc. speleol. Soc., Bristol* 2 (2): 121.
- SAVORY, A. 1971. In WATKINS (Editor) *The East Anglian Book*. East Anglian Magazine Ltd., Ipswich.
- VESEY-FITZGERALD, B. 1969. *The Vanishing Wildlife of Britain*. Macgibbon & Kee, London.
- WADE-MARTINS, P. (in press) Excavations at North Elmham.
- WHITE, G. 1789. *The Natural History and Antiquities of Selborne, in the County of Southampton*. White, London.
- WITHERBY, H. F., JOURDAIN, F. C. R., TICEHURST, N. F. & TUCKER, B. W. 1939. *The Handbook of British Birds*: 3. Witherby, London.

## Book Review

*Wild Life in the Royal Parks*. By Eric Simms. 47 pages, 33 plates, 7 maps. HMSO, London. 1974. £0.50.

This is a concise and well-illustrated publication, containing a short history and notes on the wildlife of St James's and Green Park, Hyde Park/Kensington Gardens and Regent's Park/Primrose Hill and the outer parks of Greenwich, Richmond and Hampton Court/Bushy Park. Much of the book is devoted to the breeding and migrating bird species, but there are also separate sections on ornamental waterfowl and the herds of fallow and red deer that live in the outer parks. Clear and well-defined maps show places of interest and convenient stations and car parks. The booklet is excellent value for the very moderate cost.

J. D. HOOK

# Hemiptera - Heteroptera of the London Area

## PART IX

by ERIC W. GROVES\*

(Previous parts of this paper have appeared in *The London Naturalist* as follows: Pt. I (43: 34–66, 1964); Pt. II (44: 82–110, 1965); Pt. III (45: 60–88, 1966); Pt. IV (46: 82–104, 1967); Pt. V (47: 50–80, 1968); Pt. VI (48: 86–120, 1969); Pt. VII (50: 87–94, 1972); and Pt. VIII (52: 31–59, 1973). A continuing list of abbreviations as to sources of records and for recorders' names has appeared wherever appropriate at the beginning of the parts listed above).

### MIRIDAE (Capsid bugs) (*Contd.*)

#### Subfamily: MIRINAE

*Camptozygum pinastri* (Fall.) Sp. 372 p. 283  
S p. 255 (*Zyginus pinastri*) B p. 430 (Sp. 307)

Local. Confined to Scots pine (*Pinus sylvestris*) and to a lesser extent on Norway spruce (*Picea abies*) where the adults feed on the young cones and shoots from June to September. There are two records of this species being taken in a MV light trap (see below). Essex records wanting.

MIDDX. Hampstead Heath, 8.viii.43, on *Pinus*, CHA (17); 24.vii.57, DL (54); 5.viii.60, on Scots pine, DL (HD) (54); and Highgate, n.d. [but probably vii.1883], EAN (C).

HERTS. Barnet, viii.1885, EAB (BM) (37); and just over the boundary at Harpenden, 5.viii.34, a single ♂ taken in light trap in Rothamsted Expt. Station grounds, DCT (12) (59).

KENT. Blackheath, 13.vii.69, a single example at MV light trap, AAA (51); Plumstead, WW (4) (22); TRB (37); Bostall Wood, WW (4) (22); Bromley, viii.1885, ES (HD) (4) (37); West Wickham Wood, 21.vii.1894, on pines, WW (60); Keston, FPP (HD, presented 1909).

SURREY. Shirley Common, 26.vii.1895, on pines, WW (60) (SL) (62); Reigate, on fir trees, ES (36); Mickleham, EAB (37); Box Hill, viii.1888 (adult) and 16.vi.17 (II instar larva), EAB (BM); Bookham Common, WW per FJC (62); Black Hills, Esher, 20.viii.51, FJC (SL); Esher Common, GCC (3) (37); JAP (BM); FPP (HD, presented 1909); 18.vii.53, beaten from firs, common, FJC (1/1953–54: 85–86); Oxshott Heath, TRB (37); 31.vii.15, WJA (SL); 27.vii.51, DL in WJLeQ coll. (21); 11.vii.52 and 18.vii.53, FJC (SL); vii.54, a single specimen off pine, AAA (51); 11.vii.56, on Scots pine, GEW (40) (EMM 92: 47); 17.vii.60, on Scots pine, DL (HD); Weybridge, on fir tree, ES (37) (36) (3); Chertsey, FPP (HD, presented 1909). On the boundary at Egham, 25.vii.56 and 6.viii.56, on pine, GEW (40); Pyrford Heath, 28.vi.41, FJC (SL) (62); and Byfleet, 6.vii.42, FJC (SL) (62); DL in WJLeQ coll. (21); (Basingstoke Canal), 8.vii.50, along the canal path, DL (1950–1951: 73). Beyond the boundary at Chobham, vii.1880, ES in EAN coll. (C) (3) (37); 2.viii.1895, AJC (HD); Woking, vii.1890, ES (HD) (3) (37); 15.viii.1891, AJC (HD); Camberley, viii.33, EEG (BM); Albury, 18.vii.44, 26.vii.43 and 3.viii.44, ECB (NM); Shalford, EAB (3) (37); Ewhurst, viii.1889 and viii.1890, EAB (BM) (3) (37); Leith Hill, EAB (3).

BUCKS. Beyond the boundary at Burnham Beeches, 22.vi.12, EAB (BM).

*Plesiocoris rugicollis* (Fall.) APPLE CAPSID Sp. 373 p. 284  
S p. 248 B p. 411 (Sp. 292)

\* Department of Botany, British Museum (Natural History), Cromwell Road, London SW7 5BD.

Frequent and widely distributed throughout the London Area. Its host in the wild is usually willow (*Salix* spp.) but it has also been regarded as a minor pest of apple orchards, where it blemishes the fruit causing corky scars to form on the skin of the apple. The adults of this bug have been most often found in June and July, but the occasional adult recorded from late August into September has led to the belief that a second generation may possibly follow the main one during favourable summers. It would be interesting to know to what extent numbers of this bug have been reduced in those apple growing districts where insecticides have been in general use for a number of years.

MIDDX. Hampstead Heath, 18.vii.43, on *Salix*, *CHA* (17); Finchley, 23.v.43, *CHA* (17); Mill Hill, 4.vii.58, *DL* (HD); Edgware (Scratch Wood), 4.vii.58, *DL* (54); and Hillingdon, 17.vi.33, common on *Salix*, *DCT* (33a).

HERTS. Rickmansworth, 17.vi.35, several specimens on crab-apple, *DCT* (12); and just over the boundary at Harpenden, 1933–1936, 22 examples (all ♂ ♂) taken in light trap in Rothamsted Expt. Stn. grounds, *DCT* (59); and beyond at Royston, 31.vii.19, *GEH* (BM).

ESSEX. Purfleet, *RML* (5).

KENT. Lewisham, *WW* (39); Plumstead (Wickham Lane), 30.vi.1894, on willow, *WW* (60) (4) (39); and Swanley, 1923, *AMM* (22).

SURREY. Mickleham Downs, 17.vii.48, *FJC* (SL) (62); Box Hill, 4.vii. & 8.vii.49 and 30.viii.48, *FJC* (SL) (62); Ashtead, 19.vii.47, *FJC* (SL) (62); Esher Common, 29.vi.53 and 28.viii.50, *FJC* (SL) (62); Black Pond, Esher Common, *FJC* (62); Oxshott Heath, 11.vii.52 and 26.vii.48, *FJC* (SL) (62); West End Common, 13.viii.51, *FJC* (SL); Arbrook Common, 30.vi.52 and 7.ix.48, *FJC* (SL); and on the boundary at Effingham, 22.vii.49, *FJC* (SL) (62); and Egham, 10.vi.65, on *Salix*, *GEW* (40); and beyond at Chobham, vii.1892, *ES* (HD) (3); Woking, vii.1888, *ES* (HD) (62); Horsell, 26.viii.49, *FJC* (SL) (62); and by the Basingstoke Canal between Pirbright Bridge and Frimley Green, 1954–1955, *HDS* (50).

BUCKS. Just over the boundary at Slough, 26.vii.55, on apple and willow, *GEW* (EMM 92: 35); (ICBFS) 16 & 27.vi.33 on willow *WHG* (41); and beyond at Burnham Beeches, 22.vi.12, *EAB* (BM).

*Polymerus unifasciatus* (Fab.)

Sp. 374 p. 285

D&S p. 467 (*Poeciloscytus unifasciatus*)

S p. 258 (*P. unifasciatus*)

B p. 431 (Sp. 308, *P. unifasciatus*)

Very local. This species, often confused with the next, is associated with lady's bedstraw (*Galium verum*) and the hedge bedstraws (*Galium mollugo* and *G. erectum*) on chalky soils of downlands, and by waysides; and on heath bedstraw (*G. saxatile* = *G. hercynicum*) of acid soils on heaths and commons in the London Area. The adults may be found on the host plants from June to August.

MIDDX. Heston, 14.vii.39, *HStJKD* (BM).

HERTS. Harpenden, 1954, in grounds of Rothamsted Expt. Stn., *TRES* per *DL* (54).

ESSEX. Epping Forest (Loughton), vii.1891, *H. Hansen* in *EAN* coll. (C).

KENT. Lee, *D&S* (28) (4) (39); and Chislehurst, 1900, *WW* (39).

SURREY. Coulsdon, 9.vii.11, 20.vii.07 and 12.viii.23, *ECB* (NM); Banstead, (Park Downs), 28.vii.55, *GEW* (40); Sanderstead, *JAP* (BM); Chipstead, 19.viii.06, *ECB* (NM); Reigate, *GBR* (62); Mickleham Downs, *D&S* (28) (62); *JAP* (BM); viii.1886, *EAB* (BM); 9.vii.1895, n.c. (SL); 17.vii.48 ♂ & ♀, *FJC* (SL) (1/1948–1949: 73) (62); Headley Lane, 6.viii.24, *HStJKD* (HD); *WW* per *FJC* (62); near Headley Lane [prior to 1867], by sweeping, *J&TL* (32); Box Hill, 9.viii.1894, *AJC* (HD); 30.vi.18 and 18.vii.37, *ECB* (NM); 4.vii.40, 8.vii.49, 21.vii.41, 22.vii.40, and 23.vii.34, *FJC* (SL) (62); 14.vii.51, *DL* (HD); viii.54, *GEW* (40); 1.viii.62

both sexes in some numbers on white and yellow bedstraw, and 25.viii.63, a few examples at the same locality, *AAA* (51); Ranmore Common, 30.vii.11, by sweeping, *WW* (60) (62); 27.viii.62, *PSB* (16); Bookham Common, 6.vii.35 ♂ and 16.viii.48 ♀, *FJC* (SL) (62); 29.vii.50, *DL* (1/1950–1951: 76); vii. & viii., *DL* (34); Oxshott Heath, 8.viii.1891, *AJC* (HD); viii.04, *EAB* (BM); and beyond the boundary at Chobham, viii.1882, *EAB* (BM); vii.1892, *ES* (HD); Abinger, viii.1900, *EAB* (BM); Gomshall, viii.1892, *EAB* (BM); and Guildford, 22.vii.43, *ECB* (NM).

BUCKS. Just beyond the boundary at Slough (ICBFS), 3.vii.34 and 4.vii.33, on *Galium verum*, *WHG* (41).

*Polymerus palustris* (Reut.)

Sp. 375 p. 285

B p. 433 (Sp. 309, *Poeciloscytus palustris*)

Rare. It is possible that some records of the previous species may refer to *Polymerus palustris*. Found in damp situations by ponds and marshes on its host the marsh bedstraw (*Galium palustre*) where the adults feed on the unripe fruits, from the end of June until September. It should be searched for in the London Area portions of the counties of Middx., Herts., Essex and Kent for which there are at present no records available.

SURREY. Bookham Common, 9.viii.53 ♂ & ♀, swept from *Galium palustre* by I.O.W. pond, *EWG* (24) (EMM 90: 21); 16.viii. & 27.viii.55 (adult ♀ ♀) and 21.vi & 10.vii.55 (V & IV instar larvae) by I.O.W. pond, on I.O.W. Plain and in Eastern and Western Hollows, all by sweeping *Galium palustre*, *EWG* (24) (2/37: 57, 1959); 4.viii.53 ♀ and 28.vii.31 ♂, *FJC* (SL); 5.viii. & 7.viii.50, both ♂ ♂, *DL* (SL); 2.viii.60 and 19.viii.50, *DL* (HD); 15.viii.53, *DL* (HD). [This is the voucher specimen for the record (wrongly determined as *Polymerus unifasciatus*) in 1/1953–1954: 89]; 11.viii.69, *PSB* (17); Egham, 8.vii.56, *GEW* (40); and beyond the boundary at Chobham, vii.1892, *ES* (HD).

BUCKS. Just over the boundary at Slough 1954, in damp field about 1 mile N. of the town, *GEW* (EMM 91: 36); 21.vii.55, *GEW* (40).

*Polymerus nigritus* (Fall.)

Sp. 377 p. 286

D&S p. 444 (*Systratiotus nigritus*)

S p. 257 (*Poeciloscytus nigritus*)

B p. 435 (Sp. 311)

Local. Though more commonly found on goosegrass (*Galium aparine*) it has also been taken on crosswort (*Galium cruciata*), the great hedge bedstraw (*Galium mollugo*); and lady's bedstraw (*G. verum*). Hatching in May from over-wintered eggs, the black larvae feed on the unripe fruits of the host plant, and adults may be taken from the end of June to September.

MIDDX. Ruislip, 7.viii.44, *CHA* (17); Ruislip L N R, 18.vi.57 (adult ♀ and V, IV & III instar larvae), 24.vii.56 (adult ♀ ♀ and V instar larvae), 29.vii.55 and 29.vii.58 (adults), by sweeping *Galium aparine*, *EWG* (49); and Harefield, 22.viii.16, *EAB* (BM).

HERTS. Rickmansworth, 25.vii.1900, *WW* (60); and on the boundary at Bovingdon, 17.vi.34, on *Galium mollugo*, *DCT* (12); and beyond at Royston, vi.19, *EAB* (BM); and Wymondley, *EAB* in *EAN* coll. (C).

ESSEX. Purfleet, *RML* (5).

KENT. Fooths Cray (Ruxley Gravel-pit), 21.vii.63, *KCS* (14); Birchwood, *JAP* (BM); Darenth Wood, 1893, *AJC* (HD) (4); *JAP* (BM); vii.04, *WES* in *EAB* coll. (BM); 8.vii.1900, *ECB* (NM, in *ECB* register).

SURREY. Wimbledon Common, 8.viii.1900, *ECB* (NM in *ECB* register); 25.vi.55, V instar larva, by sweeping, *EWG* (24); Coulsdon, 9.vii.11 and 18.vii.06, *ECB* (NM); Chipstead, 8.vii.59, *GEW* (40); Caterham, *GCC* (3) (37); Mickleham, D&S (28) (3) (37); *ES*, by sweeping *Stachys* [sic] (36); *JAP* (BM); *FPP* (HD, presented 1909); 1.vii.06, *ECB* (NM); Box Hill, 18.vi.38, *FDB* (SL); 9.vii. & 17.vii.38, *ECB*

(NM); 8.vii.40 and 21.vii.41, *FJC* (SL) (62); Ashtead, 11.vii.47, *FJC* (SL) (62); Bookham Common, 16.vi.57 (V & IV instar larvae), 21.vi.55 (adult ♀, V, IV & III instar larvae) and 10.vii.55 (V & IV instar larvae), *EWG* (24); 30.vii.51, swept from mixed grass and *Galium* spp., *DL* (1/1951–1952: 13) (HD); vii. *DL* (34); vii.18, *WJA* (SL); 31.vii.69, and 5.viii.69, *PSB* (16); and on the boundary at Egham, 31.vii.54, *GEW* (40); and Horsley, 30.vi.04, sweeping in chalkpit, *WW* (60) (62); and beyond the boundary at Abinger, 26.vi.15, *EAB* (BM); Shere, *EAB* (3); Gomshall, viii.1892, *EAB* (BM) (3); and Shalford, viii.1886, *EAB* (BM) (3) (37).

**BUCKS.** Just over the boundary at Chesham Vale, 5.vii.52, *WJLeQ* (21); Amersham, 18.vii.53 and 22.vii.56, *WJLeQ* (21); Slough (ICBFS), 3.vii.34 and 4.vii.33, on *Galium verum*, *WHG* (41); (PILG), various dates, *GEW* (40); and beyond at Wendover, 19.viii.15, *EAB* (BM).

*Charagochilus gyllenhali* (Fall.)

Sp. 378 p. 286

D&S p. 446

S p. 256 (*Poeciloscytus gyllenhali*)

B p. 436 (Sp. 312)

Occasional. The adults, which have been found over-wintering under moss and dead leaves, lay their eggs in the stems and leaves of various species of bedstraw (e.g. *Galium verum*, *G. mollugo*, and *G. saxatile*) at the end of May and in early June. The green larvae feed up on the host plant and become adults during July and August. Records for Middx. required.

**HERTS.** Chorley Wood, 26.viii.57, *WJLeQ* (21); Ashridge near Berkhamsted, 27.iii.34, hibernating adult in dead leaves under *Thuya*, *DCT* (12); 31.vii.33, on *Galium verum* *DCT* (12); on the boundary at Harpenden, 26.vii.55, *GGES* (HD); and beyond at Wymondley, viii.1880, *EAB* (BM).

**ESSEX.** Epping Forest (Chingford), x.1891, *EAB* (BM).

**KENT.** Erith, 1896, *WW* (39); Darenth, *JAP* (BM); and Magpie Bottom, 5.iv.64, *KCS* (14).

**SURREY.** Wimbledon Common, 17.vi.1899, *ECB* (NM in *ECB* register); 6.viii.41, *FJC* (SL) (62); Cheam (Nonsuch Park), 22.viii.55, V instar larva, *EWG* (24); Banstead Downs, 5.vii.57, V, IV & III instar larvae, *EWG* (24); Coulsdon, 5.v.06 and 9.vii.11, *ECB* (NM); Old Coulsdon (Happy Valley), 4.vii.54, by sweeping, *EWG* (24) (EMM 90: xxxix); Banstead (Park Downs), 28.vii.55, *GEW* (40); Redhill [prior to 1867], *J&TL* (32); Reigate, *ES* (BM); *WW* per *FJC* (62); Oxted, 11.vi.1893, *AJC* (HD); Headley Lane, 2.viii.1897, *WW* (60) (62); Box Hill, 18.iii.93, 1.v.97 and viii.1889, *AJC* (HD); 1895, *WW* (60) (62); 22.vii.40, 21.vii.41 and 29.vii.49, *FJC* (SL); 25.ix. & 26.ix.37, *ECB* (NM); 5.v.50, on *Galium cruciata*, *DL* (HD); 27.viii.50, *DL* (HD) (1/1950–1951: 77); 25.viii.64, on *Galium* spp., *GEW* (40); 18.ix.57 and 1.viii.62, singly, from white and yellow bedstraw, *AAA* (51), *DC* (51); Ranmore Common, 6.viii.05, on *Ononis* [sic], *WW* (60) (62); Mickleham Downs, *JAP* (BM); 1.vii.06, *ECB* (NM); vii.1896, *WJA* (SL); Ashtead Common, *FJC* (62); Bookham Common, 27.viii.1896, by sweeping, *WW* (60) (62); 19.viii.50, 30.vii.51 and 27.v.60, *DL* (HD); 15.viii.53, on *Galium* spp. by I.O.W. pond, *DL* (1/1953–1954: 89); 12.viii.56 (V instar larva), 16.viii.55 (V instar larva) and 21.vi.55 (adult), *EWG* (24); 12.viii.64, 5.viii.69 and 11.viii.69, *PSB* (16); vii. & viii., *DL* (34); and on the boundary at Horsley, *WW* per *FJC* (62); and beyond at Chobham Common, vi.1891, *ES* (HD); 29.v.55, *WJLeQ* (21); Horsell, *JAP* (BM); Shere, viii.1892, *EAB* (BM); Shalford, viii.1886, *EAB* (BM); Holmbury, viii.1892, *EAB* (BM); and Chiddingfold, 22.viii.37, *ECB* (NM).

**BUCKS.** Just over the boundary at Hodgemoor Wood, 7.vi.52, *WJLeQ* (21); Hedgerley, 10.vi.53, *GEW* (40); Stoke Common, 24.v.53, on broom [sic], *WJLeQ* (21); and beyond at Burnham Beeches, 12.vii.55, *GEW* (40); and Coombe Hill, 7.vii.63, *PSB* (16).

*Dichrooscytus rufipennis* (Fall.)

Sp. 379 p. 287

D&S p. 478

S p. 247

B p. 410 (Sp. 291)

Local. Adults of this bug found from mid-June until early September occur most frequently on Scots pine *Pinus sylvestris*, though it has been taken occasionally on other conifers. Douglas & Scott in their *British Hemiptera 1. Heteroptera*: 291 (1865) state that this species is particularly attracted to the green cones of the host tree. Essex records wanting.

MIDDX. Hampstead Heath (West Heath), 22.vi.50, on Scots pine, *DL* (HD); and at Uxbridge, 23.vi.33, on *Pinus sylvestris*, *DCT* (33a).

HERTS. Just beyond the boundary at Harpenden, 1.vii.53, a single ♂ taken in light trap in Rothamsted Expt. Stn. grounds, *DCT* (12) (59).

KENT. Dartford Heath, vii.-viii., beaten from *Pinus sylvestris*, *D&S* (28) (4) (22); Blackheath, 18.vi. & 20.vi.60, singly, and on 29.vi.69 and 1.vii.69, two on each occasion, at MV light, *AAA* (51); Bromley, *ES* (37); and at West Wickham Wood, 7.vii. & 21.vii.1894 and 4.vii.1896, on pines, *WW* (60).

SURREY. Shirley, 11.vii.1896 and 13.vii.12, beating pines, *WW* (60) (62); vii.-viii., beaten from *Pinus sylvestris*, *D&S* (28) (3); Reigate, *ES* (3) (37); Box Hill, 9.vi. & 16.vi.17, *EAB* (BM); 16.vi.17, *ECB* (NM); Mickleham, *JAP* (BM) (28) (3); Oxshott Heath, 2.vii.55, on Scots pine, *GEW* (40) (EMM 92: 47); 15.v.58, V instar larva, *EWG* (24); Esher Common, *JAP* (BM) (28) (3); and on the boundary at Egham, 6.viii.55, *GEW* (40); and beyond at Chobham, *ES* (3) (37); Woking, vi.1892, *ES* (HD); Horsell Common, 11.vii.37, *ECB* (NM); and Albury, 18.vii.44, *ECB* (NM).

BUCKS. Beyond the boundary at Burnham Beeches, 22.vi.12, *EAB* (BM); 30.vi.54, *GEW* (BM).

*Dichrooscytus valesianus* (Mey.-Dür) Sp. 380 p. 287

B p. 411 (Sp. 291a)

Very rare and local. This species is confined to a single host plant, namely juniper, occurring on chalk downland, and has been recorded from only a few localities in Britain. Two of these are well inside the Society's Area and another is on our boundary (see below). Larvae from over-wintering eggs become adult by mid-June and are found on the juniper branches until the latter half of July.

SURREY. Banstead (Park Downs), 28.vii.55, *GEW* (40); Riddlesdown, 20.vi.53, (adults) and 12.vii.58 (adults and V instar larvae), *EWG* (24) (EMM 90: 21).

BUCKS. On the boundary at Longdown Hill, 21.vii.51, *WJLeQ* (21) (EMM 86: 286); 15.vi.57, *GEW* (40).

*Miris striatus* (Linn.) Sp. 381 p. 287

*D&S* p. 320 (*Deraeocoris striatus*)

S p. 245 (*Calocoris striatus*) B p. 407 (Sp. 289, *Pycnopterna striata*)

Rare and local. This large predacious bug has been reported on several deciduous trees but in this country it is found mainly on oak where it feeds on aphids, small lepidopterous larvae (particularly that of the green oak tortrix moth *Tortrix viridana*) and larvae of leaf beetles. The adults may be taken by beating the foliage from late May to early July.

MIDDX. Hampstead, 1949, *CHA* (17), and Edgware (Scratch Wood), 5.vi.48, *CHA* (17).

HERTS. Hoddesdon, 17.vi.32, on oak, *TRE* (60); and just over the boundary at Berkhamsted Common, 4.vii.34, on *Quercus*, *DCT* (12); and beyond at Royston, 27.v.12, V instar larva, *EAB* (BM).

ESSEX. Epping Forest, 20.vi.64, *PLJR* (MM); (Walthamstow), *CN* (35a); (Highams Park), *CN* (35a); (Chingford), 29.v.1896, beaten off trees, *EAN* (C); v.1893, 5.vi.15, 10.vi.11, adult & V instar, and 14.vi.13, *EAB* (BM); (Fairmead), *CN* (35a); and (High Beach), vi.02, *EAB* (BM).

KENT. Plumstead, *WW* (4) (22); Darenth Wood, *D&S* (28) (4) (37); *JAP* (BM); 28.v.1893, *AJC* (HD); 5.vi.13, *ECB* (NM); viii.05, *WW* (60); [seems late for this

species—E.W.G.]; Otford Downs, 27.vii.63, a single specimen off hawthorn or sweeping nearby, *AAA* (51); Shoreham, 17.vi.54, *KCS* (14); and Westerham (Tower Wood), 17.vi.51, *DL* (1/1951–1952: 72).

SURREY. Banstead, 16.vi.1900, *SL* (1/1900: 14); Reigate, *GBR* per *FJC* (62); Headley Lane *TRB* (3) (37); Box Hill, 9.vi.17, *EAB* (BM); 23.v.48, *FJC* (SL) (1/1948–1949: 70) (62); Mickleham, 1.vii.06, *ECB* (NM); Ashtead, 4.vi.05, and 9.vi.06, *ECB* (NM); 13.vi.06 and 26.v.05, (V instar), *HStJKD* (HD); 4.vii.42, *FJC* (SL) (62); Bookham Common, 1878, n.c. (60); 8.vi.42 and 9.vi.34, *FJC* (SL) (62); 13.v.56 (II instar larva), *EWG* (24); vi, *DL* (34); 11.vi.39, *K. M. Guichard*; Esher Common, 7.vi.49, *FJC* (SL) (62); and on the boundary at Egham, 10.vi.55, on oak, *GEW* (40); and Byfleet, 29.v.49, *FJC* (SL) (62); and beyond on the banks of the Basingstoke Canal between Pirbright Bridge and Frimley Green, 1954–1955, *HDS* (50) (1/1954–1955: 43); Horsley, *W. H. Grace*, (HD, presented by *W. J. Lucas*, 1905); Gomshall, *EAB* (3); Hurtwood Common, 12.vi.40, *ECB* (NM); and Chiddingfold, 1898, *HStJKD* (HD).

BUCKS. Langley Park, 4.vi.55, on oak, *GEW* (40); and just over the boundary at Slough (ICBFS), 25.v. & 31.v.34, on oak, *WHG* (41).

*Calocoris quadripunctatus* (Villiers) Sp. 382 p. 288

D&S p. 318 (*Deraeocoris striatellus*) and p. 329 (*D. formicatus* D&S)

S p. 239 (*Calocoris striatellus*) B p. 405 (Sp. 287, *C. ochromelas*)

Local. Like the last species this bug is predacious and also occurs on oak where it feeds principally on aphids and small lepidopterous caterpillars. The larvae feed on the unripe flower catkins throughout May and early June, the first adults from which reach maturity soon afterwards. Only a few adults survive beyond the end of July.

MIDDX. Hampstead, 7.vi.1892, by beating hedges, *EAN* (C); Hampstead Heath, 1949, *DL* (1/1949–1950: 36–38); 1.vi.60, only a single adult but many larvae, *DL* (54); Highgate, vi.1892, *EAB* (BM); (Parliament Hill Fields), 24.vi.1892, in hedges, *EAN* (C); (Gravel Pit Wood), 15.vi.1893, beaten off trees, *EAN* (C) Stanmore Common, 30.v.60, adults (almost all newly moulted) and larvae, *DL* (54); Ruislip, vi.59, C. Fellowes; and Ickenham Golf Course Nature Reserve, 30.v.54, *EWG* (24).

HERTS. Barnet (Hadley Wood), 25.vi.44, *CHA* (17); Whippendell Wood, 3.vi.60, more adults than larvae, the latter mostly parasitized, *DL* (54) (EMM 97: 68); Hatfield, 6.vi. & 7.vi.64, *PLJR* (MM); and just beyond the boundary at Berkhamsted Common, 4.vii.34, on *Quercus*, *DCT* (12); and Ashridge, 28.vi.64, *PSB* (16).

ESSEX. Epping Forest, generally distributed, *CN* (35a); 5.vii.63, *PSB* (16); 20.vi.64, *PLJR* (MM); (Highams Park), vi.1898, *EAB* (BM); (Chingford), 29.v.1896, beaten off trees, *EAN* (C); 5.vi.15, 10.vi.11, and vii.07, *EAB* (BM); and near Chingford, 8.vi.62, larvae only, (a backward year), *AAA* (51).

KENT. Lewisham, *D&S* (28) (4) (22); Blackheath (Shooters Hill), *WW* (4) (22); Bexley, *D&S* (28) (4) (22); Darenth Wood, *D&S* (28) (4) (22); *JAP* (BM); 28.v.1893, *AJC* (HD); 5.vi.04, on oak, *WW* (60) (SL); 13.vi.66, a few examples, *AAA* (51); Orpington, 3.vi.66, *PJC* (63); West Wickham Wood, 6.vi.1896 on oak, *WW* (60); 10.vi.1899, by beating aspen [sic], *WW* (60); and Westerham (Tower Wood), 17.vi.51, *DL* (1/1951–1952: 72).

SURREY. Richmond, *JAP* (BM); Wimbledon Common, 20.v.48, *FJC* (SL) (62); Norwood, *JAP* (BM); Shirley, *JAP* (BM); Banstead, 16.vi.1900, *SL* (1/1900: 14); Chipstead, vi.51, a few taken in early part of the month, on oaks, *AAA* (51); Godstone, 22.vi.63, *KCS* (14) (48); Reigate, [prior to 1867], *J&TL* (32); Redhill, [prior to 1867], *J&TL* (32); Box Hill, 23.vii.32, *FJC* (SL) (62); Epsom Common, 27.v.60, *DL* (EMM 97: 68); Claygate, *JAP* (BM); Ashtead, 4.vi.05, *ECB* (NM); 9.vi.26, n.c. (SL); Bookham Common, 5.vi. & 8.vi.31, *FJC* (SL); 4.vi.34, *FJC* (SL) (62); Oxshott Heath, 1.vi.19, on oak, *WJA* (SL); Esher Common, 7.vi. & 8.vi.49, *FJC* (SL) (62); Arbrook Common, 3.vi.48, *FJC* (SL) (62); and on the boundary

at Egham, 10.vi.55, on oak, *GEW* (40); and Byfleet, 20.v.16, IV instar larva, *EAB* (BM); and beyond at Horsell, 6.vi.31, *FJC* (SL) (62); Brookwood, *FJC* (62); by the Basingstoke Canal between Pirbright Bridge and Frimley Green, 1954–1955, *HDS* (50); Chilworth, 12.v.34, by sweeping, *KGB* (1/1934–1935: 14); Leith Hill, 10.vi.16, *EAB* (BM); Hurtwood Common, 12.vi.41, *ECB* (NM); Guildford, 20.vi.41, *ECB* (NM); and Chiddingfold, 1898, *HStJKD* (HD).

BUCKS. Langley Park, 4.vi.55, on oak, *GEW* (40); and just over the boundary at Hodgemoor Wood, S. of Chalfont St Giles, 6.vi.53, on oak, *WJLeQ* (21); Slough (PILG), *GEW* (40); and beyond at Ballinger Common, Gt. Missenden, 19.vi.49, *SL* (1/1949–1950: 76), and Coombe Hill, 7.vii.63, *PSB* (16).

*Calocoris sexguttatus* (Fab.) Sp. 383 p. 289

D&S p. 322 (*Deraeocoris sexguttatus*)

S p. 241

B p. 403 (Sp. 286)

Common. Found on clumps of nettles growing in woods and thickets. The larvae, orange red at first, olive or purple brown later, feed on the unripe catkins and fruit of the host plant until reaching imago state in June. The adults may either feed on the nettle or be predacious on small insects (such as aphids and lepidopterous larvae) and may be found until the beginning of August. There are no Essex records to hand but this species is almost certain to occur as there are many suitable localities.

MIDDX. Hampstead Heath, 1949, *DL* (1/1949–1950: 36–38); Sunbury, 27.vi.12, *ECB* (NM); and Ruislip Local Nature Reserve, vii.64, common on nettle, *RAPM* (49).

HERTS. Widely distributed, *DCT* (12); Barnet (Hadley Wood), 27.vi.43, *CHA* (17); Aldenham, 23.vii.61 ♀, *DL* (HD) (54); Watford, 5.vii.1891, hedges along St Albans Road, *EAN* (C); Whippendell Wood, 22.vi.58, on nettle, *DL* (54) (EMM 95: 98); Chorley Wood, 11.viii.16, *EAB* (BM); Radlett, 26.vi.60, *DL* (HD) (54); 20.vi.60, *DL* (54); Bricket Wood Common, 3.vii.56, *EWG* (24); Hatfield, 19.vii.64, *AMM* (MM); Cheshunt (Temple Bar) 1.vii.61, *FB* (18); Wormley, 1963, *BSN*(58); Broxbournebury, 1963, *BSN*(58); and on the boundary at Boxmoor (Water End N.T.), 12.vi.45, *R. B. Benson*; Felden, 29.vi.46, *R. B. Benson*; and Harpenden, 28.vi.55, 13.vii, 17.vii, 21.vii. & 30.vii.54, *GGES* (HD); and beyond at Knebworth, 23.vi.11, *EAB* (BM); Wymondley, viii.1880, *EAB* (BM); and Royston, 27.v.12, several V instar larvae on nettle, *EAB*(38) (BM); 10.vi.19, V instar larva, *EAB*(BM).

KENT. Eynsford, 27.vi.63, along woodland path, chiefly on umbels of *Heracleum sphondylium*, *AAA* (51); Downe, 22.vi.69, *PSB* (16); Otford, 13.vi.25, *ECB* (NM); 28.vi.66, *PJC* (63); Shoreham, 19.vi.60 and 17.vii.60, *KCS* (14); Magpie Bottom, 25.vi.61, 9.vii.55, 15.vii.56 and 20.vii.63, *KCS* (14); and at Westerham (Squerryes Park), 24.vii.60, at edge of wood, *AAA* (51); and on the boundary at Sevenoaks (Knole Park), 31.vii.63, several on nettles under trees, *AAA* (51); and beyond at Crockham Hill, 28.vi.24, ♂ on *Bryonia dioica*, *J. C. Robbins* (BM); and Trottiscliffe, 25.vii.62, *AMM* (MM) (1/1962: 100).

SURREY. Shirley Common, 25.ix.1897, *WW* (60) (62); Coulsdon, 1.vii.23, and 8.vii.06, *ECB* (NM); Old Coulsdon, 4.vii.54, by sweeping at side of steep lane up rough slope from Happy Valley to the Welcome Tea Rooms by side of Devilsden Wood, *EWG* (24) (EMM 90: xxxix); Caterham, *GCC* (3) (37); Godstone, 22.vi.63, *KCS* (14) (48); Oxted, 11.vi.1893, *AJC* (HD); Headley Lane, *TRB* (3) (37); Box Hill, 2.vii.05 and 30.vii.13, *WW* (SL); 26.vi.39, *FJC* (SL) (62); 12.vi.37, *ECB* (NM); 30.vi.24, n.c. (SL); 1.viii.62, 3 specimens taken by path through wood, *AAA* (51); Mickleham, 29.vi.11, 1.vii.06 and 9.vii.05, *ECB* (NM); and Weybridge, 21.vi.13, *EAB* (BM).

BUCKS. On the boundary at Datchet (Ditton Park), 10.vii.54, on nettles, *GEW* (40); and just over the boundary at Amersham, 7.vi.52, *WJLeQ* (21); and at Slough (ICBFS), 6.vi.33, on oak, *WHG* (41).

*Calocoris fulvomaculatus* (De G.) HOP CAPSID

Sp. 384 p. 289

D&S p. 316 (*Deraeocoris fulvomaculatus*)

S p. 240

B p. 399 (Sp. 285)

Local. Occurs in hedgerows, thickets (particularly elm) and open clearings in woodlands, especially where the conditions are damp and where such plants as meadowsweet, nettle, wild rose and various umbellifers may be growing. It has also been found, as its vernacular name suggests, in hopfields where in the past it has caused considerable damage in some seasons to the bines. Adults are present from June until July.

MIDDX. Highgate, n.d. [but probably July 1883], on trees, *EAN* (C); Ruislip Local Nature Reserve, 15.vi.52, 18.vi.57, 19.vi.58, 27.vi.58 and 29.vii.58; both ♂♂ and ♀♀ by beating along perimeter elm thickets except for a single ♀ taken (19.vi.58) by sweeping by side of East Stream possibly off meadowsweet, *EWG* (49); Hanwell, 24.vi.1896, by sweeping grass in meadow *EAN* (C); and Hounslow Heath, n.d. *GEW* per *DL* (54).

HERTS. Barnet (Hadley Wood), 27.vi.43, *CHA* (17); Elstree, 5.vii.58, *DL* (SL); Bushey, 23.vii.44, *CHA* (17); Watford, 5.vii.1891, hedges along the St Albans road, *EAN* (C); Bricket Wood Common, 3.vii.56, *EWG* (24); and on the boundary at Harpenden, 18.vi.33 ♂ taken in light trap in Rothamsted Expt. Stn. grounds, *DCT* (12) (59); and Berkhamsted Common, 23.vii.33 ♀ *DCT* (12); and beyond at Wymondley, *EAB* (37).

ESSEX. Epping Forest, n.d. V & IV instar larvae, *EAB* (38); (Chingford), 14.vi.13, III instar larva, *EAB* (BM); 15.vi.12, adult and III instar larva, *EAB* (BM); 15.vi.12, *ECB* (NM); 20.vi.1895, beaten off bushes (sloe, etc.), *EAN* (C); 22.vi.11, *EAB* (BM); 8.vii.11, 13.vii.12, vii.07, and vii.1892, *EAB* (BM); *CN* (35a); and (Fairmead), *CN* (35a).

KENT. Abbey Wood, 9.vii.1898, on oak, *WW* (60) (4) (39); Darenth, vi., on black currant bushes and occasionally on birch trees, *D&S* (28) (4) (37); Darenth Wood, 28.v.1893, *AJC* (HD); *JAP* (BM); viii.05, *WW* (60); Bishop's Wood, *JAP* (BM); West Wickham, 24.vi.1899, *WW* (60) (SL); 7.vii.1894, *WW* (SL); Downe, 22.vi.69, *PSB* (16); Shoreham, 17.vii.60, *KCS* (14); Magpie Bottom, 25.vi.61, *KCS* (14); and beyond the boundary at Cuxton, 25.vi.49, *AMM* (MM).

SURREY. Wimbledon Common, 26.vi.1882, by sweeping, *EAN* (C) (3); Coombe, *JAP*; Cheam (Nonsuch Park), 13.viii.54, *EWG* (24); Coulsdon, 20.vi.15 and 1.vii.23, *ECB* (NM); Riddlesdown, 29.vi.64, very local, sweeping hillside in one spot, *AAA* (51); Caterham, *GCC* (3) (37); Reigate, *ES* (3) (37); Godstone, 22.vi.63, *KCS* (14) (48); Buckland Hill, 7.vii.07, *ECB* (NM); Box Hill, 22.vi.19, on oaks, *ECB* (NM); 22.vii.40, *FJC* (SL) (62); Mickleham, 29.vi.11, *ECB* (NM); Leatherhead, *TRB* (3) (37); Prince's Coverts, 16.vi.52, *FJC* (SL); Bookham Common, 20.vii.18, on oak, *WJA* (SL); 20.v.57 (V instar larva) and 16.vi.57 (V instar larva), *EWG* (24); Arbrook Common, 16.vi. and 24.vi.52, and 7.vii.53, *FJC* (SL); and on the boundary at Horsley, *HJT* in *FJC* coll. (SL) (62); East Horsley, 7.vii.1900, *SL* (1/1900: 16); and beyond at Abinger, 12.vi.15, V instar larva, *EAB* (BM); Guildford, 28.vi.43, *ECB* (NM); Shalford, *EAB* (3); and Ewhurst, *EAB* (3).

BUCKS. On the boundary at Datchet (Ditton Park), 30.vi.54, *GEW* (40); and just over the boundary at Hodgemoor Wood, 14.vii.51, *WJLeQ* (21).

*Calocoris roseomaculatus* (De G.)

Sp. 386 p. 290

D&S p. 327 (*Deraeocoris ferrugatus*)

S p. 241

B p. 398 (Sp. 283)

Local. In S.E. England this species frequents the drier localities such as are found on downland, in chalkpits and sand quarries, and also on waste ground. On the chalk its major food-plant is the salad burnet (*Poterium sanguisorba*) but elsewhere members of the plant families Compositae (e.g. yarrow, hawkweeds, cat's-ear, ox-eye daisy, etc.) and Papilionaceae (e.g. kidney-vetch, bird's foot

trefoil, rest-harrow, clover, etc.) are favoured. Adults occur from June to October. D. C. Thomas (12) reports that this species is "generally in association with *Leptopterna ferrugata*". Essex and Herts. records wanting.

MIDDX. South Harefield, 22.vi.33, a V instar larva found in a sandpit, *DCT* (33a); Hounslow Heath, 19.vii.52, *GEW* per *DL* (54); and Sunbury Island, vi.52, *AAA* (51).

HERTS. Beyond the boundary at Tring, 17.vi.33, *DCT* (12); Stevenage, viii.1880, *EAB* (BM); and Royston, 7.xi.19, *EAB* (BM).

KENT. Brockley, *WW* (39); Lewisham, *WW* (39); Erith, *WW* (39); Darenth, *D&S* (28) (4) (32); Birch Wood, *JAP* (BM); Longfield, 21.vii.52, *GGES* (HD); and just beyond the boundary at Kingsdown, 28.viii.24, *EAB* (BM); and Trottiscliffe, 25.viii.62, *AMM* (1/1962: 100).

SURREY. Coulsdon, 8.vii.06, *ECB* (NM); Old Coulsdon Valley, 4.vii.54, V & IV instar larvae, *EWG* (24); Chipstead, 30.vii.38, *FDB* (SL) (62); 11.vii.56, on *Lotus*, *GEW* (40); Banstead (Park Downs), 28.vii.55, *GEW* (40); Reigate district [prior to 1867], by sweeping, *J&TL* (32); Headley, 7.vii.29, *CHS* in *EAB* coll. (BM); Headley Lane, 10.viii.35, *ECB* (NM in *ECB* register); Box Hill, 31.v.19, II instar larva, *EAB* (BM); 18.vii.37 and 7.viii.37, *ECB* (NM); vii.17 by sweeping, n.c. [probably *WJA*] (SL); 30.vi.24, n.c. (SL); 23.vii.42, 8.vii.49, and 29.vi.42, *FJC* (SL) (62); 24.vi.51, adult *DL* (SL); V, IV & III instar larvae plentiful on flower heads of salad burnet, some taken home appeared to feed on this plant and subsequently reached maturity, *DL* (1/1951–1952: xvi); 14.vii.51, *DL* (SL); 1.viii.62 (2 ♀ ♀) but common on 25.vii.63, *AAA* (51); Mickleham Downs, vi. & vii., sweeping amongst grass, *D&S* (28); 9.vii.05, *ECB* (NM); 25.vii.63, common, *AAA* (51); Bookham Common, 6.viii.1895, *WW* (SL) (62); 1.vii.49 *FJC* (SL); 29.vii.50, *DL* (1/1950–1951: 76); on the boundary at Egham, 6.viii.55, *GEW* (40); and beyond at Chobham Common, 19.vii.68, common, *AAA* (51); Woking, vii.1880, *EAN* (C); viii.1888 and vii.1890, *ES* (HD); 21.viii.02, *AJC* (HD); Ash Vale, 8.ix.51, *WJLeQ* (21); Abinger, 26.vi.15, III instar larva, *EAB* (BM); Gomshall, viii.1892, *EAB* (BM) (3); 18.vii.51, *HDS* (64); Guildford, 22.vii.43 and 16.viii.43, *ECB* (NM); and Witley Common, 19.vii.59, *AMM* (NM).

BUCKS. Just over the boundary at Chesham, 12.viii.16, *EAB* (BM); Chesham Vale, 5.vii.52, *WJLeQ* (21); Amersham, 6.vii.52, *WJLeQ* (21); Slough, 20.vi.54, *GEW* (70); (Upton Court Road), 1953–1954, on waste plot found on *Trifolium* spp. and occasionally on other legumes, *GEW* (33d); and beyond at Northend Common, near Turville Heath, 8.viii.65, *WJLeQ* (21).

*Calocoris norvegicus* (Gmel.) POTATO CAPSID Sp. 387 p. 290  
*D&S* p. 319 (*Deraeocoris bipunctatus*)  
*S* p. 244 (*Calocoris bipunctatus*)  
*B* p. 396 (Sp. 282, *C. bipunctatus*)

Common and widely distributed in the London Area. Found in hedgerows, woodland margins, riverside vegetation and often gardens. It occurs on a wide variety of plant hosts, both wild and cultivated. Composites (e.g. ragwort, mugwort, scentless mayweed, creeping thistle), nettles and clovers seem favoured in the field, whilst under cultivation chrysanthemums, dahlias, carrots and potatoes are sometimes damaged by their presence. Adults are found from July to October.

MIDDX. Cripplegate bombed sites, City of London, 28.vii.56, adult ♂ ♂ & ♀ ♀ and V instar nymph, *EWG* (24) (25); garden in N. London, vii.1885, *EAB* (BM); St John's Wood, *JAP* (BM); Hampstead Heath, 1949, widespread on grass, *DL* (1/1949–1950: 36–38); Highgate, 25.vii.43, *CHA* (17); Finchley, 30.vii.43, on *Heracleum* and thistles, *CHA* (17); Edgware (Scratch Wood), 23.vii.60, *DL* (54) (HD); Ruislip L N R, 18.vi.57 and 27.vi.55 (V & IV instar larvae) and 27.vi.55 and 29.vii.55 (adults), frequent on damper parts of the Reserve, *EWG* (49); 1964, very common on nettles, thistle, etc., *RAPM* (49); and Hounslow Heath, 19.vii. & 26.vii.52, *GEW* per *DL* (54).

HERTS. Very abundant and widely distributed, *DCT* (12); Barnet, viii.1885, *EAB* (BM); Elstree, 22.vi.60, *DL* (54); Radlett, 20.vi.60, adults and larvae, *DL* (54) (EMM 97: 68); 20.vi.60, adult, *DL* (HD); 10.viii.68, *DL* (54); Bricket Wood Common, 3.vii.56, adult & V instar larvae, *EWG* (24); Cheshunt, 19.vii.06, *AJC* (HD); Hatfield, 18.viii.63, *PLJR* (MM); Rye Meads, 1964, *BSN* (58); and on the boundary at Harpenden, 11.viii.37, a ♀ found laying eggs in bark of large elm tree, *DCT* (12); 1934, 2 ♂, 1 ♀, taken in light trap in Rothamsted Expt. Stn. grounds, *DCT* (59); 5.vii. & 12.vii.55, 24.vii.54, 29.vii.55 and 5.ix.54, *GGES* (HD); and beyond at Tring, 16.vii.40 and 16.vii.41, *FJC* (SL).

ESSEX. Epping Forest, generally distributed, *CN* (35a); (Theydon Bois), vii.22, *EAB* (BM); and Stone Point, 1964, *BSN* (58).

KENT. Lewisham, *WW* (4) (39); Blackheath, 19.vii.1895, *AJC* (HD); 5.vii.59, 26.vi.60 and many other dates—a late one being 14.ix.58—swept from various weeds, grasses and mixed herbage, *AAA* (51); Charlton, 9.ix.58, a single example on waste ground “now (1970) built on”, *AAA* (51); Plumstead, 29.vii.1894, *AJC* (HD); 17.ix.57, a few, *AAA* (51); Abbey Wood, 30.vii.1898, by sweeping, *WW* (60); Abbey Wood, north of the railway, vii.62 & vii.63, etc., *AAA* (51); Abbey Wood marshes (Erith Marshes), 24.vii.54 and 31.viii.55 (adults) and 31.viii.55 (III instar larva), by sweeping, *EWG* (24); Lee (Hither Green Lane), 11.viii.1894, by sweeping bank, *WW* (60) (4) (39); *JAP* (BM); Kidbrooke, 6.viii.1898, by sweeping, *WW* (60) (SL); 23.vii.1898, *WW* (SL) (39); Kidbrooke Lane, 14.vii.1894, by sweeping, *WW* (60); Fooths Cray (Ruxley Gravel-pit), 21.vii.63, *KCS* (14); Stone, 4.vii.64, *KCS* (14); Dartford Marshes, 15.vii.63, *KCS* (14); Greenhithe, *FPP* (HD, presented 1909); Darenth Wood, 6.vii.55, V & IV instar larvae, *EWG* (24); *FPP* (HD, presented 1909); South Darenth (Darenth Chalkpit), 27.viii.57, common, *AAA* (51); Horton Kirby, 2.vii.61, *KCS* (14); Farningham Wood, 2.vii.61, *KCS* (14); Downe (Darwin's Bank), 15.ix.62, *KCS* (14); Magpie Bottom, 25.vi.61, *KCS* (14); and Westerham (Squerryes Park), 24.vii.60, very common, *AAA* (51).

SURREY. Kew, *FPP* (HD, presented 1909); Wimbledon Common, 25.vi.55 (adult & V instar larvae), *EWG* (24); Merton, *JAP* (BM); 8.vii.1882, *EAN* (C); 11.ix.1888, beaten out of hedges in Bunce's fields, *EAN* (C); Merton Park, 5.vii.47 and 3.viii.35, *FJC* (SL) (62); Cheam (Nonsuch Park), 8.vii. & 22.vii.55 and 13.viii.54, *EWG* (24); Hackbridge, viii.51, *LC* (64); Carshalton Beeches, once at MV light, *DC* per *AAA* (51); Banstead Downs, 5.vii.57, V & III instar larvae, *EWG* (24); *DC* per *AAA* (51); Coulsdon, 26.vii.64 and 16.ix.51, in garden by sweeping, *HGD* (65); 8.viii.51, in garden on *Achillea*, *HGD* (65); Old Coulsdon (Happy Valley), 4.vii.54, III instar larva, *EWG* (24); Reigate, *FPP* (HD, presented 1909); 6.-7.viii.50, sweeping in hedgerow, *GBR* (45) (62); (Redstone Hill) [prior to 1867], by sweeping, *J&TL* (32); Oxted, 11.vi.1893, *AJC* (HD); Box Hill, *WW* per *FJC* (62); 16.vi.17, V, IV & III instar larvae, *EAB* (BM); Mickleham, *JAP* (BM); Ashtead Common, 20.vii.46, *FJC* (1/1946-1947: 74) (62); 11.vii.47, *FJC* (SL); Leatherhead, *FJC* (62); Bookham Common, 9.viii.53, V, IV, III & II instar larvae, *EWG* (24); 16.viii.53, V instar larva and 21.vi.55, III instar larva, *EWG* (24); vii. & viii.65, *DC* per *AAA* (51); Esher Common, 12.vii.52, *FJC* (1/1952-1953: 84); Arbrook Common, 30.vi.52, *FJC* (SL); and on the boundary at Egham, vii.57, *GEW* (40); Effingham, 22.vii.49 and 30.vii.51, *FJC* (SL) (62); East Horsley, 7.vii.1900, *SL* (1/1900: 16); and Ripley, 25.vii.58, on *Polygonum persicaria*, L. K. Ward (BM); and beyond at Chobham Common, 19.vii.68, *AAA* (51); Woking, viii.1888, *ES* (HD); by the Basingstoke Canal between Pirbright Bridge and Frimley Green, 1954-1955, *HDS* (50); Ash Vale, 4.ix.49, *DL* (1/1949-1950: 78); Milford, 13.vii.63, *PSB* (16); Burpham, 20.vii.43, by the River Wey, *ECB* (NM); and at Chilworth, 13.vii.1882, by sweeping, *EAN* (C).

BUCKS. Langley Park, 1.viii.53, *GEW* (40); and just over the boundary at Slough (ICBFS), 7.vi., 14.vi., 21.vi., 22.vi., & 27.vi.33, and 18.vi., & 27.vi.34, on *Cirsium arvense*, *Urtica dioica* and *Heracleum sphondylium*, *WHG* (41); (Upton Court Road); 1953-1954, on waste plot, plentiful, *GEW* (33d).

*Adelphocoris ticinensis* (Mey.-Dür)

Sp. 389 p. 290

D&S p. 330 (*Deraeocoris ticinensis*)

S p. 242 (*Calocoris ticinensis*)

B p. 394 (Sp. 280)

Rare. Has been recorded only from the Surrey part of the London Area where it seems to be restricted to the damper commons and heaths. It is said to be associated with plants such as *Lotus uliginosus*, *Mentha aquatica* and *Lysimachia nemorum*, feeding on the unripe fruit. The imago occurs from August to October.

SURREY. Bookham Common, 18.viii.38, *FJC* (SL) (62); 7.viii.50, *DL* in *WJLeQ* coll. (21); vii. & viii., *DL* (34); Esher Common, adults, 21.viii.54 & 4.viii.55, *EWG* (24); West End Common, 25.viii.52 & 10.ix.51, *FJC* (SL); and on the boundary at Egham, 27.vi.60, *GEW* (40); and beyond at Chobham, 1874, *ES* (HD) (36); viii.1876, *ES* (HD) (36) (3); viii.1882, *EAB* (BM); 18.viii.35 & 30.viii.36, *ECB* (NM); Ash Vale, 21.viii.51, *GEW* (HD); Gomshall, 12.ix.1868, *JAP* (BM); viii.1869, Brewer in *JAP* coll. (BM); *ES* (37) (36) (3); and Chilworth, viii.1886, *EAB* (BM) (37) (3).

*Adelphocoris lineolatus* (Goeze)

Sp. 390 p. 292

D&S p. 325 (*Deraeocoris chenopodii*)

S p. 243 (*Calocoris chenopodii*)

B p. 392 (Sp. 279)

Frequent. Found in both damp and dry situations favouring various plants always in direct sunlight. D. C. Thomas (12) reports that its main food is *Ononis repens* (*O. arvensis*) but in the absence of this species Woodroffe (33d) notes that it may feed on *Lotus*, *Medicago* and *Trifolium*. It has also been reported on composites (such as *Artemisia* and *Matricaria*) and on the chenopod white goosefoot (*Chenopodium album*). On all these hosts both the adults and larvae feed upon the young leaves, flowers or unripe fruits. The adults occur from July to October.

MIDDX. Cripplegate bombed site, City of London, x.54, adult, *W. G. Teagle*, (EMM 91: xxvii); 23.vii.55 (adults and V, IV & III instar nymphs) and 28.vii.56 (V, IV, III, II & I instar nymphs) *EWG* (25); Hampstead Heath, 1949, *DL* (1/1949–1950: 36–38); Finchley, 9.vii.47, *CHA* (17); Edgware (Scratch Wood), 22 & 26.vii.60, larvae outnumbering the adults, *DL* (54) (EMM 97: 68); 26.vii.60, *DL* (HD); Harefield, 22.vii.33, a few on *Ononis*, *DCT* (33a); Ruislip L N R, 18.vi.57, 24.vii.56 & 29.vii.55 (V & IV instar larvae) and 29.vii.58, 1.ix.55 & 19.ix.56 (adults) all swept from mixed vegetation, *EWG* (49) (24); and Hounslow Heath, 18.viii.56, *DL* (54).

HERTS. Whetstone, 26.viii.60, ♂ taken in MV light trap, *PHW* (pers. comm.) & (47); and just over the boundary at Harpenden (grounds of Rothamsted Expt. Station), 1933–1936, 180 ♂♂ and 26 ♀♀ taken in light trap, *DCT* (59); 17.viii.55, & 1.ix.54, *GGES* (HD); and beyond at Stevenage, viii.1880, *EAB* (BM); Hitchin, n.d. *RP* (11); Herts Beacon, 14.viii.33, on *Ononis*, *DCT* (12); and Tring, 13.ix.41, *FJC* (SL).

ESSEX. Purfleet, *JAP* (BM).

KENT. Blackheath, occurring casually in garden at 63 Blackheath Park in August & September between the years 1957–1968 and also rarely at light during the months of July & August between the years 1959–1969, *AAA* (51); Blackheath, rather common on white goosefoot *Chenopodium album* and mugwort *Artemisia vulgaris* in a lane, *AAA* (51); Charlton, 9.ix.58, very common on mugwort on waste ground (now built on), *AAA* (51); Abbey Wood marshes, 31.viii.55, *EWG* (24); Lee, *WW* (4); Kidbrooke (Birdbrook), *JAP* (BM); Dartford, 17.ix.1890, *DS* (C); Swanscombe, 16.viii.62 & 4.ix.64, very abundant in the chalkpit, probably associated with Papilionaceae, *AAA* (51); Darenth, 13.ix.52, in chalkpit near Lane End, by sweeping *Brassica tenuifolia* [sic], *TRES* (13); and Shoreham, 1.ix.61, *KCS* (14); and beyond the boundary at Milton near Gravesend, 21.viii.51, on *Artemisia*, *TRES* (13).

SURREY. Camberwell (Linsen Road), 5.viii.53, to house light, and 4.ix.53 to MV lamp, *SW* (44); Cheam (Nonsuch Park), 8.vii.55 (V instar larvae), 22.vii.55 (adults ♂ & ♀, and V, IV & III instar larvae) and 13.viii.54 (adult & V instar larvae) *EWG* (24); Addington, 6.x.62, *SL* (1/1962: 104); Coulsdon, 3.ix.11, *ECB* (NM); Chipstead, 5.viii.06, *ECB* (NM); Riddlesdown, 1.viii.53, *EWG* (24); Reigate, 16.viii.04, *AJC* (HD); n.d., *GBR* per *FJC* (62); Headley Lane, 1897, *WW* (60); Box Hill, 15.ix.17, *EAB* (BM); 5.ix.09, 13.viii.05, 10.viii.35, 18.viii.36, all *ECB* (NM); 21.vii.41, 22.vii.32, 29.vii.49, 30.vii.40, & 21.viii.39, all *FJC* (SL) (62); 27.viii.50, *DL* (1/1950–1951: 77); Ranmore Common, 27.viii.62, *PSB* (16); Mickleham, 26.ix.1897, *WJA* (SL); 4.ix.53, *DG* in *SW* coll. (44); Epsom Common, 6.ix.53, *EWG* (24); Oxshott, 29.vii.05, *ECB* (NM); Esher Common, 4.viii.55, *EWG* (24); Bookham Common, vii., viii., & ix, *DL* (34); 16.viii.48, *FJC* (SL) (62); 19.vii.53 (I instar larvae), 19.vii.53 & 9.viii.53 (III), 21.vi.55 & 9.viii.53 (IV), 9.viii.53 & 16.viii.55 (V), 9.viii.53 & 13.ix.56 (adult ♂), 29.ix.55 (adult ♀), and 16.viii.55, 13.ix.53 & 4.x.53 (other adults), all records of *EWG* (24); 11.viii.69 & 1.ix.69, *PSB* (16); West End Common 10.ix.51, *FJC* (SL); and on the boundary at Egham, 21.vii.54, *GEW* (40); Horsley, viii.1900, *EAB* (BM); and Ripley, viii.1900, *EAB* (BM); and beyond at Virginia Water, 22.viii.1894, *WW* (60); Chobham, 1.ix.35, *ECB* (NM); Woking, viii.1888, *ES* (HD); 21.viii.02, *AJC* (HD); 1.ix.41, *FJC* (SL) (62); by the Basingstoke Canal between Pirbright Bridge and Frimley Green, 1954–1955, *HDS* (50); Chilworth, ix.1883, sweeping in a lane, *EAN* (C); Guildford, 6.viii.43, *ECB* (NM); and Ewhurst, viii.1896, *EAB* (BM).

BUCKS. On the boundary at Datchet, 15.viii.56, *GEW* (40); and just beyond at Coleshill, 2.ix.50, *WJLeQ* (21); Amersham, 12.viii.55 to light, *WJLeQ* (21); Slough (Upton Court Road), 1953–1954, on waste plot on *Lotus*, *Medicago*, and *Trifolium*, *GEW* (33d); Slough (ICBFS), 12.vii.29 in ditch, and 3.x.31 on shrubs, *WHG* (41).

*Megacoelum infusum* (H.–S.)

Sp. 391 p. 293

D&S p. 331 (*Deraeocoris infusus*)

S p. 244 (*Calocoris infusus*)

B p. 390 (Sp. 278)

Local. Occurs on oak where it is predacious on aphids, psyllids and other small insects. D. C. Thomas (12) also reports it as being on *Ulmus*. It overwinters in the egg stage from which the reddish-orange larvae hatch during the period from about mid-June until early July. Adults may be found from July until October.

MIDDX. Buckingham Palace grounds, 1961, larvae on oak, *TRES* (52); Hampstead Heath, 8.vii.43, *CHA* (17); ix.49, on oaks, local, *DL* (1/1949–1950: 36–38); 13.vii.52, adult ♂, *DL* (HD) (54); 5.viii.60, larvae only, *DL* (54) (EMM 97: 68); 17.viii.56, V instar larvae, *DL* (54); (West Heath), 21.viii.49, adult on oak, *DL* (HD) (54); Highgate, ix.1892, *EAB* (BM); Finchley, 8.vii.43, *CHA* (17); Palmers Green, 20.ix.20, *EAB* (BM); Southgate, 16.viii.1883, by sweeping in Gt. Northern Cemetery, *EAN* (C) [This record may be just within the Herts. boundary—E.W.G.]; Edgware (Scratch Wood), 23 & 26.vii.60, V, IV & III instar larvae but no adults, *DL* (54) (EMM 97: 68); and Hounslow Heath, 16.ix.52, *GEW* per *DL* (54).

HERTS. Whetstone, 12.viii.61, ♂ taken in MV light trap, *PHW* (HD) (47); Barnet, viii.1885, *EAB* (BM) (37); *EAB* in *EAN* coll. (C); and on the boundary at Harpenden, 1934, a ♂ taken in light trap in Rothamsted Expt. Stn. grounds, *DCT* (59); Harpenden Common, 23.vii.60, IV instar larva, *DL* (54).

ESSEX. Hale End, ix.1891, *EAB* (BM); Woodford, 7 & 18.viii.25, *EAB* (BM); Buckhurst Hill, 18.viii.25, *EAB* (BM); Chingford, x.07, *EAB* (BM); ix.12, *EAB* (BM); 13.vii.14, III instar larva, *EAB* (BM); *CN* (35a); Epping Forest, 15.vii.12, IV & III instar larvae, *EAB* (38); (Loughton) *TRB* (37).

KENT. Greenwich Park, *WW* (4) (39); Blackheath, *WW* (39) (22); (garden of 63 Blackheath Park), 7 & 8.viii.59, ♂ to MV light trap “arrived about dawn”, *AAA* (51); (Shooters Hill), 13.ix.60 and 29.vii.61, a single adult off oaks on both

dates, *AAA* (51); Lewisham, viii., by beating oaks, *D&S* (28) (4) (36) (37); 21.viii.1892, *AJC* (HD); (Hither Green Lane), 11.viii.1894, on oak, *WW* (60); Lee, *WW* (4) (39) (22); *TRB* (37); Kidbrooke, 27.viii.1898, on oak, *WW* (60); Eltham, *JAP* (BM); Darenth Wood, *AMM* (22); Bromley, viii.1885 & viii.1887, *ES* (HD) (4) (37); Orpington, 6.x.66, *PJC* (63); and on the boundary at Sevenoaks (Knole Park), 9.ix.61, on oak, *AMM* (1/1961: 88).

**SURREY.** Wandsworth, *ES* (3) (37); Tooting Bec, 10.vii.24, I & II instar larvae, *EAB* (BM); 30.vii.24, III instar larva, *HStJKD* (HD); Kew Gardens, 21.vii.60, II instar larva on *Quercus lusitanicus* near Cambridge Cottage garden, *L. Watson* (7/1961: 180); Wimbledon Common, 6.viii.41, *FJC* (SL) (62); Cheam (Nonsuch Park), 13.viii.54, *EWG* (24); Shirley Common, 14.viii.1897, 20.viii.1898, & 25.ix.1897, all on oak, *WW* (60) (62); Reigate, n.d., *ES* (3) (37); near Redhill, viii.1869, in train, *n.c.* (HD); Box Hill, n.d., *WW* per *FJC* (62); Claygate, *JAP* (BM); Ashtead, *GCC* (3) (37); 15.viii.46 & 28.ix.46, *FJC* (SL); Bookham Common, 16.viii.38, *FJC* (SL) (62); 12.viii.56, *EWG* (24); 14.viii.60, *DL* (HD) (34); 11.viii.69, *PSB* (16); Oxshott, 24.ix.09, *ECB* (NM); *TRB* (3) (37); viii.15, *n.c.* (60); 8.x.51, *FJC* (SL); Esher, *JAP* (BM); and on the boundary at Wisley Common, 11.viii.1899, on oak, *WW* (60) (62); and at Byfleet, 8.ix.35, on oak, *FJC* (1/1935–1936: 28); 1.ix.41, *FJC* (SL) (62); and beyond at Chobham, *ES* (36); *TRB* (3) (37); Horsell Common, 7.viii.43, *ECB* (NM); Camberley, viii.33, *EEG* (BM); Charlwood, *ES* (3); Gomshall, *ES* (36) (37) (3); Chilworth, 18.viii.1886 & 25.viii.1885, *EAN* (C); (Blackheath), 30.viii.36, general sweeping, *FJC* (1/1936–1937: 36) (62); Guildford, 2.viii.41, *ECB* (NM); Farley Heath, *EAB* (3); and Chiddingfold, 1898, *HStJKD* (HD).

**BUCKS.** Just over the boundary at Latimer, 5.ix.50, *WJLeQ* (21); Amersham, 14.ix.52, on oak, *WJLeQ* (21); Slough (ICBFS), 21 & 26.vii.33, on oak and willow, *WHG* (41); *GEW* (40).

*Megacoelum beckeri* (Fieb.) Sp. 392 p. 294  
B p. 391 (Sp. 278a)

Rare. Occurs on Scots pine *Pinus sylvestris* where both larvae and adults are predacious on aphids and often found running over the bark in company with ants (e.g. *Formica rufa*) which likewise seek the same prey. The adults have been found from August until early October. Records for Herts., Essex and Kent wanting.

**MIDDX.** Uxbridge, 24.vii.33, a single ♀ on *Pinus sylvestris*, *DCT* (33a).

**SURREY.** Oxshott, 3.viii.19, 20.ix.18, & 31.ix.19, near *Formica rufa* nests, *HStJKD* (10) (BM) (1/1919–1920: 37) (Ent. Record 31: 9); 4.ix.51, *HDS* (SL); 1.x.51, *FJC* (SL); 24.viii.52, on pine, *WJLeQ* (21); Esher Common, 17.ix.51, *FJC* (SL); 2.x.50, *DL* (1/1950–1951: 79); West End Common, 20.viii.51, *FJC* (SL); Weybridge, 27.viii.18 (adult) *HStJKD* (BM); 24.vii.19, III instar larvae with *Formica rufa*, *HStJKD* (HD) (BM) (1/1919–1920: 37) (Ent. Record 31: 9); on the boundary at Byfleet, 9.ix.35, *FJC* (SL); and beyond at Chobham, viii.1893 & viii.1900, *ES* (HD); Ash Vale, 10.ix.50, a single adult on pine, *DL* (1/1950–1951: 80); 8.ix.51, *WJLeQ* (21); Camberley, 1.x.29, *EEG* (BM); Albury, 3.viii.44, *ECB* (NM); and Chilworth (Blackheath), 30.viii.36, *FJC* (SL).

**BUCKS.** Just over the boundary at Amersham, 5.x.50, *WJLeQ* (21).

*Stenotus binotatus* (Fab.) Sp. 393 p. 294  
D&S p. 323 (*Deraeocoris binotatus*)  
S p. 246 (*Oncognathus binotatus*)  
B p. 409 (Sp. 290)

Common and widely distributed throughout the London Area on heaths and commons, open pastures, hedgerows and along those roadside verges where the vegetation is not cut every year. It is associated with various species of grass, especially the cocksfoot *Dactylis glomerata*, meadow foxtail *Alopecurus pratensis* and timothy *Phleum pratense*. The adults are found from June to August.

MIDDX. Buckingham Palace grounds, 1961, taken at light in August, *TRES* (52); Regent's Park, N.W.1, 26.vi.57, *DL* (SL); Hampstead Heath, 20.vi.43, *CHA* (17); 1949, *DL* (1/1949–1950: 36–38); Finchley, 8.vii.44, on *Holcus lanatus*, *CHA* (17); Edgware (Scratch Wood), 22.vii.60, *DL* (54); 23.vii.60, *DL* (HD) (54); Ruislip L N R, 27.vi.55 (V & IV instar larvae) 24.vii.56 (adult & V instar larva), 29.vii.55 & 29.vii.58 (adults) swept from grass, *EWG* (49) (24); and Hounslow Heath, 14.vii.53, common in dry grass on the heath area, *GEW* (33c) (54).

HERTS. Whetstone, 30.vi.60 ♂ & ♀, 7.vii.60 ♂ and 1.viii.60 ♂ & ♀, all taken in MV light trap, *PHW* (pers. comm.) and (47); Elstree, 22.vi.60, *DL* (54); Aldenham, 23.vi.61, *DL* (54); Barnet, viii.1885, *EAB* (BM); Rickmansworth, 4.vii.1900, *WW* (60); Radlett, 20.vi.60, *DL* (54) (EMM 97: 69); 26.vi.60, *DL* (HD); Bricket Wood Common, 3.vii.56, adult and 4, IV & III instar larvae, *EWG* (24); and just over the boundary at Harpenden, 1933–1936, 80 ♂♂ (♀♀ nil) taken in light trap in Rothamsted Expt. Stn. grounds, *DCT* (59); 7.vii.54, 12.vii.54, 21.vii.54, 30.vii.54 & 1.viii.54, all adults, *GGES* (HD); Digsowell, 1963, *BSN* (58); and at Rye Meads, 1963, *BSN* (58).

ESSEX. Ilf[ord], vii.1888, *ES* (HD).

KENT. Elmers End, 21.vii.1900, by sweeping, *WW* (60); Blackheath, garden at 63 Blackheath Park, comes freely to MV light, *AAA* (51); Plumstead, *WW* (39); Abbey Wood marshes, 24.vii.54, *EWG* (24); Erith, *WW* (39); Lewisham, *WW* (39); Kidbrooke, *WW* (39); Bexley, *D&S* (28) (4) (22); Fooths Cray (Ruxley Gravel-pit), 8.vii.67, *KCS* (14); Darenth, *D&S* (28) (4) (22); (Birch Wood) *JAP* (BM); Farningham Wood, 2.vii.61, *KCS* (14); Otford, 28.vi.66, *PJC* (63); and Otford Downs, 16.vii.65, *AAA* (51).

SURREY. Tooting Bec, 10.vii.24, IV instar larva, *EAB* (BM); Cheam (Nonsuch Park), 8.vii.55, adult and III instar larva, *EWG* (24); 22.vii.55, adult and V instar larva, *EWG* (24); Carshalton Beeches, at light, *D. Collins* per *AAA* (51); Warlingham (Halliloo Valley) 2.viii.63, *KCS* (48) (14); Banstead Downs, *AAA* (51); Old Coulsdon Valley, 4.vii.54, V & IV instar larvae, *EWG* (24); Chipstead, 5.viii.05, *ECB* (NM); Riddlesdown, 12.vii.58, V instar larva, *EWG* (24); Earlswood [prior to 1867], by sweeping, *J&TL* (32); Headley, 6.ix.54, *KCS* (14); Headley Lane, 2.viii.1897, *WW* (60) (62); Box Hill, 16.vi.17, III instar larva, *EAB* (BM); *FJC* (62); Ranmore Common, 4.viii.23, n.c. (SL); Mickleham, 29.vi.11, *ECB* (NM); Mickleham Downs, 17.vii.48, *FJC* (SL) (62) (1/1948–1949: 73); Claygate, *JAP* (BM); Ashtead, 21.vi.47, & 10.vii.46, *FJC* (SL); Ashtead Woods, 20.vii.46, *FJC* (1/1946–1947: 74) (62); Bookham Common, 7.vii.34, *FJC* (SL); 29.vii.50, *FJC* (1/1950–1951: 76) (62); 10.vii.55, larvae I instar, 21.vi.55 II instar, 16.vi.57 IV instar, 10.vii.55, 14.vii.58, 19.vii.53 V instar, and 19.vii.53 adults and 9.viii.53 ♀♀, all records of *EWG* (24); 3.vii.58 *DL* (SL); *AAA* (51); 20.vii.69, 31.vii.69, 5.viii.69, 9.viii.66 & 11.viii.69, *PSB* (16); vii. & viii., *DL* (34); Oxshott Heath, 8.viii.1891, *AJC* (HD); *WW* per *FJC* (62); *AAA* (51); Arbrook Common, 25.vi.48, *FJC* (SL) (62); Weybridge, 30.vi.63, *PSB* (16); and on the boundary at East Horsley, 7.vii.1900, *SL* (1/1900: 16); and Egham, 10.vii.54, on grasses, *GEW* (40); and beyond at Chobham, vii.1892, *ES* (HD); 22.vii.33, *ECB* (NM); Basingstoke Canal, between Pirbright Bridge and Frimley Green, 1954–1955, *HDS* (50); Abinger, 26.vi.15, V & III instar larvae, *EAB* (BM); Gomshall, 9.viii.36, *FJC* (SL) (62); Shere, viii.1892, *EAB* (BM); Guildford, 22.vii.43 & 9.vii.43, *ECB* (NM); Shalford, viii.1886, *EAB* (BM); Ewhurst, viii.1889, *EAB* (BM); and Felbridge, 16.viii.39, *ECB* (NM).

BUCKS. Just over the boundary at Slough (ICBFS), 19.vi.34 & 23.vi.33 on hazel and on grass, *WHG* (41); (PILG), *GEW* (40); and the Chiltern Hills, viii.15, *EAB* (BM).

(End of Part IX)

# The Decline and Reappearance of Migratory Fish in the Tidal Thames, with Particular Reference to the Salmon, *Salmo salar*

by D. J. SOLOMON\*

With the recent publicity surrounding the salmon (*Salmo salar* L.) found in the tidal reaches of the Thames, interest has been focused on the improving quality of the river, and the increasing status of the returning species. This report sets out to describe the decline of various migratory fish during the 19th century and the gradual return over the last 15 years of formerly abundant species, and to discuss the reasons for these changes. The Thames is the longest river in England, and once supported a correspondingly large community of migratory fish species which passed through the tidal reaches at various stages of their life histories. With heavy fishing, pollution and navigation engineering, effected by the increasing human population of the lower watershed, it was inevitable that deterioration in the stocks of fish would occur.

By 1800 populations of many species were considerably reduced, and the final decline in runs of Thames salmon occurred in the early years of the 19th century. Records exist of captures at Boulters Weir, Maidenhead, between 1794 and 1821. A total of 483 salmon were caught in these years, over 60 being taken in 1801 and 1804 (Wheeler 1958). Catches had fallen dramatically by the end of the period, none being taken at Boulters Weir in 1820 and only two in 1821 (Day 1887). Buckland (1879) records that a 20-pounder was caught near Windsor in 1820, and was sold to the King for over £20. In the following year a fresh Thames salmon was required for the coronation of George IV, and a price of 30s. per lb. was offered, but none was caught in time. A day later, however, two were caught between Blackwall and Woolwich by one fisherman.

Buckland (1879) considered that the prime cause of the rapid decline of the salmon run in the early 19th century was the deepening of the river by weir construction for navigation, "drowning out" the spawning areas. Certainly the date of construction of the weirs at Teddington, Hampton Court (Molesey), Sunbury, Shepperton, Chertsey and Penton Hook, and many others, between 1811 and 1815, fits this theory. That these weirs were not totally impassable to migrating salmon is indicated by the catches at Boulters in 1815–21, and Windsor in 1820.

Reports of occasional captures during the 1820s and early 1830s exist, including one at Monkey Island in 1830. Most authorities (e.g. Fitter 1945, Wheeler 1958) suggest that the last salmon caught upstream of London was in June 1833, records also existing for the River Lee up to this year. However, it seems likely that single specimens were caught in the lower Thames in 1859 and 1860 (Field 23 May 1885) and further single fish were captured in 1861 and 1862 (press reports quoted by Day (1887)). The Thames Angling Preservation Society, apparently encouraged by these reports, released several thousand fry into the river in 1862, and the following year two smolts (young salmon migrating to sea) were reported at Southend. Also in 1863 a 5 lb salmon was reported in the River Darent, a tributary of the Thames joining 30 km below London Bridge. In the same year a hatchery was established on the River Lee, and 7,000 young salmon were released into the Thames in the following year. In April 1864 a 14½ lb salmon was reported in the Medway, and a 12½ lb fish at Southend a month later. During the years 1861–1865 various agencies released about 50,000 young salmon into the River Thames.

Murie (1903) records a 7½ lb salmon in Long Reach, below Purfleet (32 km below London Bridge) in 1866, and a further five fish in the Southend area between

\* 2c Airlie Gardens, London W8.

that year and 1891. He also reports sea trout (sea-going *Salmo trutta* L.) in the Medway (1866 and 1883) and two small trout between Waterloo and Hungerford Bridges in the heart of London in 1880. Buckland (1879) stated that he received the bodies of sea trout from the estuary in most years. The status of this fish in the area had been much less reliably recorded, but it is believed that numbers of both species declined at about the same time. During this period the tidal area had become steadily more polluted, and no migratory salmonids were recorded as having penetrated beyond the lower estuary. Around the turn of the century several further attempts were made at stocking with young fish, but the state of the upper tidal reaches meant that all such enterprises were doomed to failure.

Wheeler (1958) records the disappearance of various other migratory and brackish water species from the river around the turn of the century. A flounder (*Platichthys flesus* (L.)) was reported at Chiswick in 1895, but the species had become scarce many years previously. Twaite shad (*Alosa fallax* (Lacépède)) had disappeared by this time, though it still occurred further down the estuary, possibly breeding in creeks in the Southend area where it was regularly caught by anglers. The last sea lamprey (*Petromyzon marinus* L.) and lampern (*Lampetra fluviatilis* (L.)) were recorded in 1899, and smelt (*Osmerus eperlanus* (L.)) was last seen at Putney, Kew and Teddington in 1900.

The condition of the river continued to decline, despite temporary local improvements, throughout the early part of the 20th century, and Wheeler (1969) suggests that between 1920 and 1960 there was no fish life between Fulham (10 km above London Bridge) and a point 40 km below London Bridge, with the exception of eels (*Anguilla anguilla* (L.)).

Since the Second World War gradual improvements have been taking place in the water quality of the river, largely due to the efforts of the LCC (now the GLC) and the Port of London Authority. By 1956 the increase in water temperature, which had been taking place at the rate of 1°C every 11 years since 1920 due to power-station cooling water outfalls, was reversed with the replacing of the older stations with new ones downstream between Tilbury and Barking (Port of London Authority 1967). In 1959 32 km of the river was anaerobic for nine months, but the last such conditions were recorded in the early 1960s. In 1963 improvements in the Crossness sewage outfall (21 km below London Bridge) led to oxygen being present in all water samples taken thereafter. An agreement with the Central Electricity Generating Board to use the old Battersea "A" Power-station only at times of high river flows reduced pollution with sulphur dioxide from flue gas washing. It was estimated that eight tons of oxygen per day were being consumed by the chemical reactions following discharge to the river (PLA 1967).

During the early 1960s, odd reports of fish appearing on the cooling water intake screens of Thames power-stations prompted Wheeler (1969) to organise collections of fish thus trapped. Since that time there has been an encouraging increase in the number of species recorded in the tidal Thames. In 1968 smelt were reported at Fulham Power-station, and in April and May of that year specimens of elvers and a twaite shad were seen at West Thurrock, 35 km below London Bridge. A year later an essentially marine species with a liking for fresh water, the sand goby (*Pomatoschistus minutus* (Pallas)), was caught at Fulham. By this time specimens of many freshwater fish were being reported throughout the tidal Thames area.

In February 1971 two sea trout were reported live in the river (Wheeler 1972). One, a 56 cm specimen, was found stranded at Deptford, and the other, 42 cm in length, was taken at the tidal limit at Teddington. Specimens have been reported in the Tilbury area in each year since 1971. In April 1972 many elvers were present at Hammersmith Bridge and Richmond, well upstream of the centre of London. Later that year flounders were reported at Teddington (*Angling Times* 25 January 1973), Woolwich (*Angling Times* 18 January 1973), and in 1974 at Hackney Marshes on the River Lee (*Angling Times* 7 August 1974). A salmon reported dead on the

Fulham intake screens by the press (*Daily Telegraph* 21 September 1966) was almost certainly a case of mistaken identification, and doubt exists as to the true identity of sea trout reported at Eel Pie Island in 1962 (Marlborough 1963), and at Hampton Court in February 1972 (*Angling Times* 4 March 1972).

In April 1973 the Port of London Authority offered an annual £250 prize for the largest salmon caught by rod and line on the tidal Thames between Southend and Teddington. In the event of no salmon being caught, the prize would go for the largest sea trout. In May 1973 a 28 lb salmon was found dead in the tidal Medway at Snodland, access to which point would have taken the fish through part of the PLA area mentioned above. In August 1973 a second specimen, live and weighing about 6 lb, was removed from the Medway, also near Snodland, by the Kent River Authority. Although no fish qualified that year for the PLA prize, a smaller prize was given for the capture of a sea trout just outside the area at Southend.

A salmon was removed from the intake screens of West Thurrock Power-station (35 km below London Bridge) in November 1974, and was said to have been alive at the time. This event was widely reported by the press. It is to be expected that salmon and sea trout will turn up occasionally in the area now that the river is cleaner, though with the nearest salmon rivers being in Yorkshire and Hampshire, they will be well off their migratory routes. In order to make the Thames once more a salmon river an intensive stocking programme would have to be carried out to provide a stock of fish which would consider the river as "home", and fish passes constructed on some weirs to give access to possible spawning grounds in the upper reaches and tributaries. Before this is done careful consideration must be given to all the implications for anglers and riparian owners, as well as to the political and financial aspects.

#### REFERENCES

- BUCKLAND, F. 1879. *18th Annual Report of the Inspectors of Salmon Fisheries*. HMSO, London.
- DAY, F. 1887. *British and Irish Salmonidae*. London.
- FITTER, R. S. R. 1945. *London's Natural History*. Collins, London.
- MARLBOROUGH, D. 1963. A supplement to "The fishes of the London Area". *Lond. Nat.* 42: 62–70.
- MURIE, J. 1903. *Report on the Sea Fisheries and Fishing Industries of the Thames Estuary*. Kent and Essex Sea Fisheries Committee, London.
- PORT OF LONDON AUTHORITY. 1967. *The Cleaner Thames, 1966*. Port of London Authority, London.
- WHEELER, A. C. 1958. The fishes of the London Area. *Lond. Nat.* 37: 80–101.
- WHEELER, A. C. 1969. Fish-life and pollution in the lower Thames: a review and a preliminary report. *Biol. Conserv.* 2(1): 25–30.
- WHEELER, A. C. 1972. Trout in the tidal Thames. *Biol. Conserv.* 4(4): 306–307.

# Survey of Bookham Common :

## THIRTY-THIRD YEAR

### Progress Report for 1974

#### **General (G. Beven\*)**

On 15 August 1974 Mr E. F. Youngman retired as Keeper for the National Trust. This was a great loss to the survey. For ten years he had worked hard and with great success to improve the general aspect and amenities of the Common, all the while keeping in close touch with the survey team and the natural history interests, particularly before making any clearance of vegetation. In addition to his National Trust duties he found time to help the survey team in many ways and keep a watchful and friendly eye on the Research Hut. We are indeed grateful to Mr and Mrs Youngman, and wish them happiness in their new home. We are very pleased to welcome Mr Nigel Davies, the new Keeper, and his family, and we look forward to continued co-operation with the National Trust.

#### **Vegetation: Algae (A. E. Le Gros †)**

A species of *Cladophora* (probably *C. glomerata* (L.) Kütz.) was once fairly widespread in the ditches and streams but pollution from oil and other substances in the late sixties caused the disappearance of this branched alga. However, in March 1972 it was found to be densely coating the pebbly bottom of a long stretch of Central Ditch and it has since been seen in Bank's Stream. A sample of *Trachelomonas hispida* var. *coronata* Lemm. was cultured from dried mud and detritus collected from the bottom of Crater Pond in October 1972. From a similar sample taken in November 1972 from Bayfield Pond I cultured a clone of the desmid *Closterium venus* Kütz., in which one semicell had the normal two pyrenoids but the other semicell had three. The algae of Sheepbell Pond were first investigated in 1974 and appear to be rich, a number of species being previously unrecorded for the Common. *Characium* sp., *Scenedesmus quadricauda* (Turp.) Bréb., *Draparnaldia plumosa* (Vauch.) Ag., and the diatoms *Gomphonema acuminatum* Ehr., *Melosira* sp. and *Navicula* spp. were noted as common epiphytes on *Lemna minor*.

#### **Vegetation: Umbelliferae, Juncaceae, Cyperaceae and Gramineae (R. C. Sternø)**

Umbelliferae were recorded over the period 1970–1974 by the vegetation regions devised by A. W. Jones and compared with his list (*Lond. Nat.* 33: 25–47 (1954)). Jones recorded 18 species including *Hydrocotyle vulgaris*. Four of these (*Aethusa cynapium*, *Chaerophyllum temulum*, *Oenanthe crocata* and *O. fistulosa*) occurred in only one or two places and can no longer be found. No species new to the Common have been discovered. None of the species was regarded by Jones as common, although some were said to be frequent on the plains. Three species are now growing in several more vegetation regions than before: *Aegopodium podagraria*, *Angelica sylvestris* and *Conopodium majus*. The other species are occurring in more or less the same regions as previously, but some of them are apparently more common than they used to be. Species which are now common on the plains include *Angelica sylvestris*, *Heracleum sphondylium*, *Pastinaca sativa* and *Torilis japonica*. It is possible that these plants were commoner than Jones indicated, because they were grazed and unable to flower as freely as nowadays; however, it seems more likely that in the absence of grazing they are more abundant than formerly.

Juncaceae. All the 10 species recorded by Jones have been found again except for *Juncus tenuis*. In general, they appear to have roughly the same distribution and abundance as formerly, except for *Juncus bulbosus*, which seems much less

\* 16 Parkwood Avenue, Esher, Surrey.

† 155 Glenfarg Road, Catford, London SE6 1XW.

ø 50 Fordwater Gardens, Yapton, West Sussex.

common, although it may have been overlooked in the recent survey. It is doubtful whether *Luzula campestris* can now be regarded as "frequent". *Luzula multiflora* was not recorded by Jones but it has now been found on Eastern Plain in T.

Cyperaceae. *Isolepis setacea* was found in the ditch alongside the Common Road (T) in 1971 but has not been found since. As it was recorded in division T by Jones, it is probably present all the time, but only flourishes during wet seasons. The *Carex* species have all been recorded again except for *C. caryophyllea*, *C. demissa*, *C. panicea*, *C. piulifera* and *C. spicata*; it is likely that most of these, except perhaps for *C. caryophyllea*, are still present but have been overlooked, since this family has been given rather less attention than the other three under report.

Gramineae. The following species recorded by Jones have not been found again in 1971–1974:

*Aira caryophyllea*: Perhaps lost through the intensive car parking and picnicking in its only station near Hundred Pound Bridge.

*A. praecox*: As above.

*Alopecurus myosuroides*: Presumably a chance ephemeral in Jones' time.

*Apera spica-venti*: As the previous species, but this is in any case much less common generally than 20 years ago.

*Brachypodium pinnatum*: Only recorded in one clearing in a wood in division D and now probably overgrown.

*Briza media*: Recorded as "rare in grassy places" and has probably succumbed to scrub invasion.

*Bromus commutatus*: Jones said this species required confirmation.

*Festuca arundinacea*: This was recorded as "very rare" and as it is a very striking grass, it looks as if it has gone.

*Koeleria gracilis*: Recorded by Jones as "locally frequent", mainly on the plains, and it is sad that such an attractive grass seems to have disappeared, probably through scrub invasion and competition from more vigorous species.

*Nardus stricta*: Only recorded from Eastern Plain, where there have been several changes since Jones' time.

*Trisetum flavescens*: Recorded in several places by Jones, and probably ousted by competition.

*Vulpia bromoides*: As above.

*Zerna erecta*: Jones said "a doubtful record".

The only significant losses from the above list are the four or five species which grew in the grazed areas, which are now scrub or coarse grassland. In general, Jones recorded few grasses as more frequent than occasional, and very few as common. It is possible that in the relatively heavily grazed condition, the grasses were kept fairly short and did not flower very freely, so that there was a tendency to under-record. The impression is gained that species such as *Agrostis stolonifera*, *Dactylis glomerata* and *Lolium perenne* are now more common than formerly. No species new to the Common have been found, but new stations have been established for *Agropyron caninum* (S), *Festuca gigantea* (in C, J, K, M and T—now certainly no longer rare in woods), *Holcus mollis* (B, C, M and N) and *Melica uniflora* (K).

### Crustacea: Cladocera (John Hearn\*)

#### Notes on the Cladocera for 1971

These results were obtained from samples taken by J. W. Coles on 9 and 13 June, 11 July, 8 August, and 12 September 1971. In the list the months in which the species were found are indicated by the number of the month in brackets, e.g. (8) — August. I am grateful to Mr Coles for allowing me access to them.

\* 37 Vernon Road, Sutton, Surrey SM1 4QX.

Isle of Wight Pond: *Alona quadrangularis* (O. F. Müller) (6, 8), *Ceriodaphnia laticaudata* P. E. Müller (7, 8), *Ceriodaphnia megalops* Sars (6, 8), *Ceriodaphnia quadrangula* (O.F.M.) (7), *Chydorus latus* Sars (6), *Chydorus sphaericus* (O.F.M.) (6, 7, 8), *Daphnia longispina* O.F.M. ♀ (6, 7, 8, 9), *D. longispina* ♂ (7), *Daphnia obtusa* Kurz ♀ (7, 8), *D. obtusa* ♂ (8), *Leydigia leydigi* Schödler (6, 7), *Macrothrix laticornis* (Jurine) (6), *Pleuroxus trigonellus* (O.F.M.) (6), *Scapholeberis mucronata* (O.F.M.) (6, 7, 8, 9), *Simocephalus vetulus* (O.F.M.) (6, 8, 9).

Pit 1, Eastern Plain in square 821 on the Castell grid: *Ceriodaphnia megalops* (7), *Chydorus sphaericus* (6), *Daphnia longispina* ♀, ♂ (6), *Daphnia obtusa* ♀, ♂ (7), *Daphnia pulex* (De Geer) ♀, ♂ (6), *Simocephalus vetulus* (7).

Pit 2, Eastern Plain in square 588 on the Castell grid: *Ceriodaphnia quadrangula* (8).

Lower Eastern Pond: *Ceriodaphnia megalops* (7), *Daphnia pulex* ♀, ♂ (7), *D. pulex* form "minnehaha" (7).

Stream near Isle of Wight Pond in square 573 on the Castell grid: *Ilyocryptus sordidus* (Liéven) (6), *Leydigia leydigi* (6).

### *Notes on the Cladocera for 1974*

These results were obtained from samples taken by myself and J. W. Coles on 12 May, 9 June, 9 July, 11 August, 13 October, 10 November and 31 December 1974. I am grateful to Mr Coles for allowing me access to his samples. The acidity of the water was measured on 10 November and 31 December 1974. On the first occasion the pH of all samples was 5·5 while on the second date all samples had a pH of 6·0. These values were obtained using narrow range pH paper. Both of these results show the water to be slightly acid. The month in which each species occurs is shown by the numbers in brackets, e.g. November — (11).

Bayfield Pond: *Chydorus sphaericus* (O. F. Müller) (12), *Daphnia obtusa* Kurz (12), *Simocephalus vetulus* (O.F.M.) (12).

Small pond in square 766 on the Castell grid near Bayfield Pond: *Daphnia obtusa* (12), *Scapholeberis mucronata* (O.F.M.) (10), *Simocephalus vetulus* (12).

Bank's Stream in square 416 on the Castell grid: *Chydorus sphaericus* (5).

Crater Pond: *Acroperus harpae* Baird (12), *Chydorus sphaericus* (11, 12), *Daphnia longispina* O.F.M., ♀, ♂ (5, 10, 11), *Daphnia obtusa* (5, 10, 11, 12), *Graptoleberis testudinaria* (Fischer) (11).

Eastern Plain Pit 1 in square 821 on the Castell grid: *Chydorus latus* Sars (11), *Daphnia obtusa* ♀, ♂ (11).

Isle of Wight Pond: *Acroperus harpae* (10), *Ceriodaphnia laticaudata* P. E. Müller (10, 11), *Ceriodaphnia megalops* Sars (10, 11), *Ceriodaphnia quadrangula* (O.F.M.) (11), *Chydorus latus* (10, 11), *Chydorus sphaericus* (5, 7, 10, 11), *Daphnia longispina* ♀ (5, 6, 7, 10, 11), *D. longispina* ♂ (10, 11), *Daphnia obtusa* (6, 10), *Daphnia pulex* (De Geer) (6, 11), *Graptoleberis testudinaria* (10, 11), *Macrothrix laticornis* (Jurine) (5, 6, 7, 11), *Pleuroxus denticulatus* Birge (11), *Scapholeberis mucronata* (5, 7, 10, 11), *Simocephalus vetulus* (5, 6, 7, 10, 11).

Kelsey's Pond: *Chydorus sphaericus* (12), *Daphnia longispina* (12), *Daphnia obtusa* (12), *Daphnia pulex* (12), *Simocephalus vetulus* (12).

Lower Eastern Pond: *Ceriodaphnia laticaudata* (10), *Chydorus latus* (10), *Daphnia longispina* ♀ (10, 11, 12), *D. longispina* ♂ (10), *D. longispina* form "minnehaha" (10, 11), *Daphnia obtusa* (5), *Daphnia pulex* (10, 11, 12), *Simocephalus vetulus* (10, 11).

Mark Oak Central and South Ponds: *Chydorus sphaericus* (12).

Sheepbell Pond: *Alonella nana* (Baird) (10), *Ceriodaphnia laticaudata* (10), *Chydorus latus* (10), *Chydorus sphaericus* (10, 12), *Daphnia obtusa* (10), *Simocephalus vetulus* (10).

South-east Pond: *Acroperus harpae* (12), *Chydorus sphaericus* (11, 12), *Daphnia longispina* (11, 12), *Daphnia obtusa* ♀ (11, 12), *D. obtusa* ♂ (11).

Ditch in square 813 on the Castell grid near Isle of Wight Pond: *Daphnia obtusa* (11). This is a temporary area of water.

Pit on Eastern Plain in square 836 on the Castell grid: *Chydorus sphaericus* (12). This is a temporary area of water.

Pond in Stent's Wood in square 265 on the Castell grid: *Daphnia longispina* (12). This is a temporary area of water.

Upper Eastern Pond: *Ceriodaphnia laticaudata* (10), *Ceriodaphnia quadrangula* (10), *Daphnia longispina* (10, 11), *D. longispina* form "minnehaha" (10, 11), *Daphnia obtusa* ♀, ♂ (10), *Daphnia pulex* (11).

### *Checklist of the Cladocera of Bookham Common*

There have been a number of previous records of Cladocera from Bookham Common: Castell (1958), Beven (1968, 1969), Anon. (1970), Coles (1972, 1973). In addition to these references I have used the data from my own samples taken in 1974 and previously unworked samples taken in 1971 by J. W. Coles. Mr Coles has given me access to previously unpublished results from the 1973 samples. Table 1 is a comprehensive list of species found up to December 1974.

A total of 26 species have been found on Bookham Common, compared with 88 species for the whole of the British Isles. Some of the species on the British list are very rare and others seem to be limited to large areas of water such as are not found on the Common. This makes the area rich as far as species composition is concerned. In addition to these 26 species forms of two *Daphnia* species have been found; these are included in Table 1 as are the males of *Daphnia longispina*, *D. obtusa* and *D. pulex*. In all the other species tabulated only the females have been found; reproduction occurs by parthenogenesis and so males are not produced at all times of the year.

Table 1 shows the species found and the sites in which they occur. Each month and year of occurrence is shown in the body of the table; the month has been converted to a number: e.g. 6, 8/74 means June and August 1974 and not June to August 1974.

I should like to thank Mr J. W. Coles for access to his samples and the previously unpublished results for 1973. I should also like to thank Mr A. E. Le Gros for advice on the names and position of some of the ponds on the Common. The records from Bookham are being used as data in the Cladocera mapping scheme for the British Isles being run in conjunction with the Biological Records Centre at Monks' Wood Experimental Station. The author would welcome results or samples containing Cladocera from any part of the British Isles.

### REFERENCES

- ANON. 1970. Crustacea. *Lond. Nat.* **49**: 98.
- BEVEN, G. 1968. Freshwater invertebrates. *Lond. Nat.* **47**: 90.
- BEVEN, G. 1969. Crustacea. *Lond. Nat.* **48**: 129.
- CASTELL, C. P. 1958. Crustacea. *Lond. Nat.* **37**: 57-58.
- COLES, J. W. 1972. Freshwater invertebrates. *Lond. Nat.* **50**: 102-103.
- COLES, J. W. 1973. Other Crustacea. *Lond. Nat.* **52**: 76.

TABLE 1 Checklist of the Cladocera of Bookham Common. Three figure references are on the Castell grid.

Species	Site	Bayfield Pond	Bayfield 2 (766)	Bank's Stream (416)	Crater Pond	Eastern Plain Pit 1 (821)	Eastern Plain Pit 2 (588)	Isle of Wight Pond
<i>Acroperus harpae</i> Baird					12/74			10/74
<i>Alona costata</i> Sars								9/73
<i>Alona quadrangularis</i> (O. F. Müller)								6, 8/71
<i>Alonella excisa</i> (Fischer)								9/57
<i>Alonella nana</i> (Baird)								
<i>Ceriodaphnia laticaudata</i> P. E. Müller								7, 8/71
<i>Ceriodaphnia megalops</i> Sars						7/71		10, 11/74
<i>Ceriodaphnia quadrangula</i> (O.F.M.)						6/73		9/57; 4/70
<i>Ceriodaphnia reticulata</i> (Jurine)								6, 8/71; 10, 11/74
<i>Chydorus latus</i> Sars								7/71; 11/74
<i>Chydorus sphaericus</i> (O.F.M.)		12/74		5/74	11, 12/74	6/71		9/57; 6, 7, 8/71
<i>Daphnia curvirostris</i> Eylmann								5, 7, 10, 11/74
<i>Daphnia longispina</i> O.F.M. ♀								7/73
<i>D. longispina</i> ♂					5, 10, 11/74	6/71		5/68; 6, 7, 8, 9/71
<i>D. longispina</i> form "minnehaha"					5, 10, 11/74	6/71		7, 9, 10, 11/73
<i>Daphnia obtusa</i> Kurz	♀		12/74			6.7/71		5, 6, 7, 10, 11/74
<i>D. obtusa</i> ♂		12/74	12/74		5, 10, 11, 12/74	11/74		7/71; 10, 11/74
<i>Daphnia pulex</i> (De Geer)	♀				5, 10, 11, 12/74	6.7/71		8/71
<i>D. pulex</i> ♂			4/55			11/74		9/57; 9/68
<i>D. pulex</i> form "minnehaha"								6, 11/74
<i>Eury cercus lamellatus</i> (O.F.M.)								3, 5/68
<i>Graptoleberis testudinaria</i> (Fischer)								10, 11/74
<i>Ilyocryptus sordidus</i> (Liéven)					11/74			
<i>Leydigia leydigi</i> Schödler								6, 7/71
<i>Macrothryrix laticornis</i> (Jurine)								6/71; 9/73
<i>Pleuroxus denticulatus</i> Birge								5, 6, 7, 11/74
<i>Pleuroxus trigonellus</i> (O.F.M.)								11/74
<i>Polyphemus pediculus</i> (L.)								6/71
<i>Scapholeberis mucronata</i> (O.F.M.)								5, 10/73
<i>Simocephalus exspinosus</i> (Koch)								9/57, 5/68
<i>Simocephalus vetulus</i> (O.F.M.)								6, 7, 8, 9/71; 9/73
		12/74	12/74					5, 7, 10, 11/74
						7/71		5/57
								4/49; 9/57; 7, 9/67
								5/68; 6, 8, 9/71
								5, 6, 7, 10, 11/74



**“Minnehaha” forms of *Daphnia longispina* and *D. pulex***

“Minnehaha” variation was recognised by Johnson (1952) in his work on the genus *Daphnia*. Originally it had been given specific status by Herrick (1884: 57). The variation is found in individuals which are, otherwise, typical of the species.

The form taken by the variation is shown in Fig. 1. It consists of a row of small ‘hooklets’ on the dorsal margin of the head shield. I have found only two references to this variation in the British literature, one by Johnson (1952) and the other by Smyly (1955). In both of these accounts it was stated that the young individuals show this variation but it is not present in the adults. This is also the case with both species at Bookham.

The “minnehaha” form of *Daphnia longispina* was found in Lower Eastern Pond in October and November 1974 but it was absent in samples taken in December. It has also been found by Johnson at Little Stanmore Common and by Smyly in Scale Tarn and Wise Een Tarn in Windermere. I have also found it in samples taken in 1974 at Great Bookham village, near Penryn in Cornwall, and at Stevenage in Hertfordshire. This seems to support the statement made by Smyly that “it is likely that the form is more common than these scanty records suggest”. It would be quite easy to miss seeing the small hooks especially if there are a large number of individuals in a sample.

The “minnehaha” form of *Daphnia pulex* appears to be even rarer as there is only one recorded locality, at Thetford in Norfolk (Johnson 1952). Thus the record from Lower Eastern Pond in July 1971 appears to be only the second record of this form from the British Isles.

I should like to thank Mr J. W. Coles for allowing me access to the samples he took from Lower Eastern Pond in 1971.

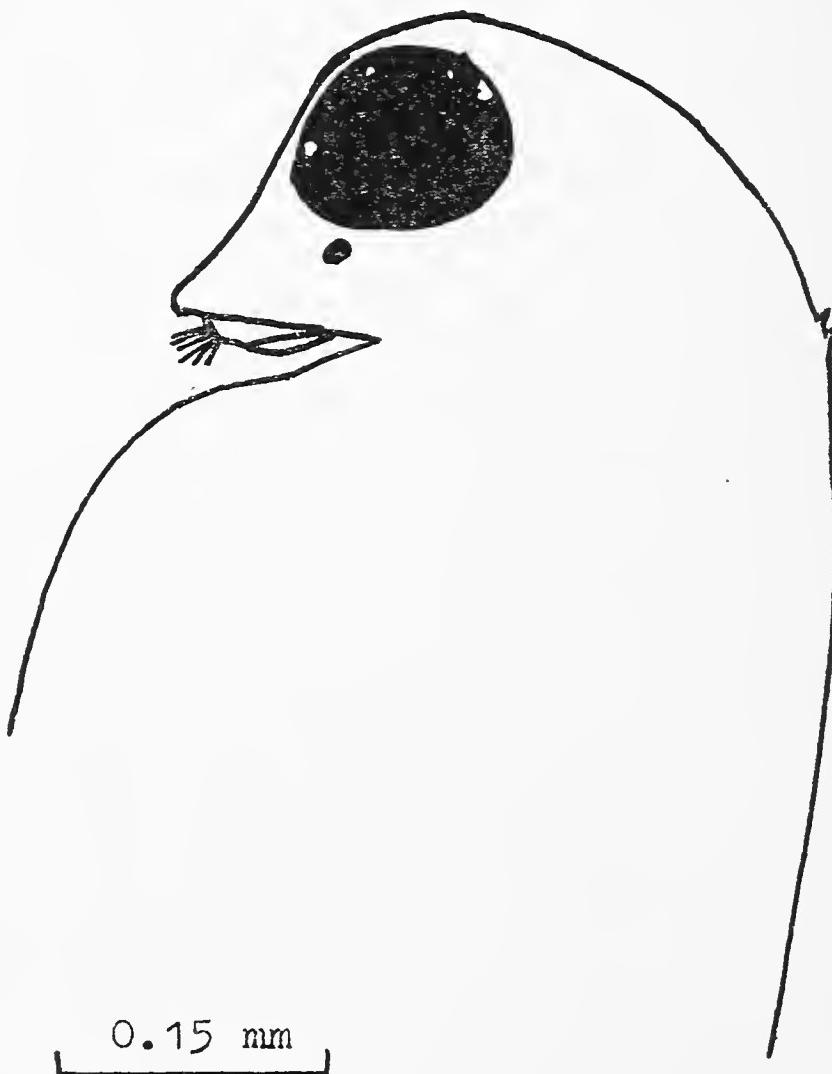


FIG. 1 The “minnehaha” form of *Daphnia longispina*.

## REFERENCES

- HERRICK, C. L. 1884. A final report on the Crustacea of Minnesota. *Rep. geol. nat. Hist. Surv. Minn.* **12** (5).
- JOHNSON, D. S. 1952. The British species of the genus *Daphnia* (Crustacea, Cladocera). *Proc. zool. Soc. Lond.* **122**: 435–462.
- SMYLY, W. J. P. 1955. A “minnehaha” form of *Daphnia longispina* O. F. Müller. *J. Quekett microsc. Club.* IV, **4**: 217–218.

**Crustacea: Entomostraca (J. W. Coles\*)**

(Identified by Miss A. R. Gurney and confirmed by Dr G. A. Boxshall)

**CLADOCERA**

- Daphnia curvirostris* Eymann: Isle of Wight Pond 8.7.73, Lower Eastern Pond 9.9.73, 11.11.73.
- D. longispina* O. F. Müller: Isle of Wight Pond 8.7.73, 9.9.73, 15.10.73, 12.11.73.
- D. obtusa* Kurz: Lower Eastern Pond 11.11.73.
- Daphnia* sp.: Pit 82/1 11.6.73.
- Polyphemus pediculus* (L.): Isle of Wight Pond 15.10.73.
- Scapholeberis mucronata* (O. F. Müller): Isle of Wight Pond 9.9.73 (in two samples collected from different parts of the pond).
- Macrothrix laticornis* (Jurine): Isle of Wight Pond 9.9.73 (in two samples).
- Alona costata* Sars: Isle of Wight Pond 9.9.73.
- Ceriodaphnia megalops* Sars: Pit 82/1 11.6.73.

**COPEPODA (CYCLOPOIDA)**

- Tropocyclops prasinus* (Fischer) Schmeil: Isle of Wight Pond 8.7.73.
- Microcyclops? bicolor* (Sars): Isle of Wight Pond 8.7.73.
- M. varicans rubellus* (Lilljeborg): Isle of Wight Pond 9.9.73.
- Mesocyclops dybowskii* (Lande): Isle of Wight Pond 9.9.73.
- Cyclops strenuus* (Fischer) (s. str.): Isle of Wight Pond 11.11.73.
- C. strenuus abyssorum* Sars: Isle of Wight Pond 11.11.73.
- Eucyclops agilis* (Koch) Sars: Central Ditch (81/2 adjacent to a bridge) 15.10.73.
- E. macrurus* (Sars): Isle of Wight Pond 11.11.73.
- Paracyclops fimbriatus* (Fischer): Isle of Wight Pond 11.6.73, Central Ditch (82/1 adjacent to a bridge) 15.10.73.
- Acanthocyclops vernalis* (Fischer) (s. str.): Isle of Wight Pond 9.12.73.
- A. vernalis americanus* (Marsch): Pit 82/1 11.6.73.
- Acanthocyclops* sp. (juvenile): Isle of Wight Pond 9.9.73.

**COPEPODA (CALANOIDA)**

- Diaptomus gracilis* Sars: Isle of Wight Pond 9.9.73 (in two samples collected from different parts of the pond) also 11.11.73.

(Note: The Isle of Wight Pond was drained and cleaned out between December 1972 and February 1973, but did not refill until the heavy rain of 5–6 May 1973)

**Vermes: Hirudinea: A Further Note on the Medicinal Leech**

(E. W. Groves†)

Apropos of Mr A. E. Le Gros's note on the medicinal leech (*Hirudo medicinalis* L.) (Le Gros 1974) it is worth reporting two records for this species on Bookham Common more recent than those given by him.

The late Mr C. P. Castell in his manuscript Bookham Survey notebooks recorded finding on 23 April 1955 a large leech in the Isle of Wight Pond “? the Medicinal Leech”. This he must have afterwards confirmed for in conversation with me

\* Department of Zoology, British Museum (Natural History), Cromwell Road, London SW7 5BD.

† Department of Botany, British Museum (Natural History), Cromwell Road, London SW7 5BD.

sometime later he told me that he had collected a specimen there "a few years ago". He further added "that it [i.e. *Hirudo medicinalis*] was in the pond in the early days of the survey [i.e. in the 1940s] and possibly even before the War". This last suggestion is of course borne out by the 1938 record cited by Le Gros (1974).

On 12 March 1961 I was pond dipping for *Corixidae* at the side of the embankment of the Isle of Wight Pond when I was joined by two small boys anxious to help with their own nets. After several dips one of the boys turned up several *Corixa* spp. and also a large leech, the entire catch of which he handed to me. On arrival home reference to the key in Mellanby (1948) proved that this leech with the unusual dark markings was indeed an adult *Hirudo medicinalis*.

Clegg (1965: 162) also repeats much the same statement as Mann (cited by Le Gros 1974) i.e. that this species of leech, when adult, requires mammalian blood and "hence was at one time common in ponds that were visited regularly by cattle or horses for drinking". As the last *regular* source for such blood for the medicinal leech in the Isle of Wight Pond was probably prior to 1920 when cattle last extensively grazed Central Plain (Spreadbury 1957) and would have come to drink in this pond close by, one is inclined to the view that the survival therein of adult *Hirudo medicinalis*, from at least 1938 to 1961, is more likely due to a blood meal source supplied from vertebrate hosts other than cattle. This could have been provided by frogs, toads, newts, and possibly an occasional fish or waterfowl (all of which have been recorded from the pond) and would have been in accordance with the findings of Autrum (also cited by Le Gros 1974). The well known zoological writer and former member of our Society, the late L. R. Brightwell, stated some years ago (Brightwell 1935) that the medicinal leech could live for anything up to 15 years and that a single full blood meal would suffice it for nine months. It seems therefore that the host, whatever species may be chosen, does not necessarily have to be present in (or visit) a pond in large numbers for the satisfactory survival of *Hirudo medicinalis* over a long period of time.

#### REFERENCES

- BRIGHTWELL, L. R. 1935. Looking after leeches. *Daily Mail* 9 June 1935.  
 CLEGG, J. 1965. *The Freshwater Life of the British Isles*. Ed. 3. Warne, London.  
 LE GROS, A. E. 1974. Vermes: Hirudinea: The Medicinal Leech. *Lond. Nat.* 53: 74-75.  
 MELLANBY, H. 1948. *Animal Life in Freshwater*. Ed. 3. Methuen, London.  
 SPREADBURY, W. H. 1957. Bookham Common before 1914 and after. *Lond. Nat.* 36: 54-57.

#### Insecta: Lepidoptera (K. J. Willmott\*)

*The decrease of the white-letter hairstreak Strymonidia w-album (Knob)*  
 In 1971 the white-letter hairstreak was extremely abundant, on suitable days being counted in dozens feeding on creeping thistles and bramble. I observed varying numbers around almost every elm tree on the Common, and many had even taken refuge in nearby oaks. In 1972 they were still common but were not in quite the same profusion as in 1971, when I believe their abundance was due to the fine summer of 1970. This affected several species which were exceedingly plentiful that year, notably holly blue *Celastrina argiolus* (L.), white admiral *Limenitis camilla* (L.) and purple hairstreak *Thecla quercus* (L.).

In 1973 there appeared the first signs that Dutch elm disease was severely affecting the elms: numerous trees showed sparse foliage and several were felled in an attempt to control it. Nevertheless in 1974 there was a further spread of elm disease and the hairstreak population dropped alarmingly. Most of the Bookham elms are of the rough-leaved common elm *Ulmus procera* Salisb., which is evidently more prone to disease than the smoother leaved varieties. The white-letter hairstreak now has difficulty in finding trees with sufficient foliage. It spends most of the

\* 34 Daybrook Road, Merton Park, London SW19.

day high on the elms, sunning itself, courting and mating, and there it rests overnight. Thus the leaves, as well as being the only food of the larvae, also play a vital part in the life of the adults. The conservation of this species must be watched with concern, and whilst perilously scarce both on the Common and indeed throughout the country these hairstreaks should not be collected at all.

#### *White admiral Limenitis camilla L. var. nigrina on the Common*

On 7 July 1974 a very dark butterfly was seen skipping along one or two feet at a time down a bramble-filled ride, pausing to feed on patches of mud. On close inspection it proved to be an "all black" form of the white admiral showing no white at all on its upper wings, although the white edging to its hindwings seemed more pronounced than on normally marked specimens. Unfortunately photography was not possible.

#### **Insecta: Chalcids (A. E. Le Gros)**

On 12 May 1974 I found two cocoons of a spider-hunting pompiliid wasp in a moss-packed cell in the stem of an umbellifer in Central Plain. From these in the first week of June I reared 33 females and 2 males of the pteromalid parasite *Eupteromalus pompilicola* Graham. Dr R. Askew, who determined these chalcids, told me that in addition to being the first definite English record of the species, the males had been hitherto unknown. Apart from some specimens in Manchester Museum without locality data, the species was known otherwise only from Co. Wicklow and Perthshire.

#### **Birds (G. Beven)**

##### *Population Studies in Oak-wood*

The breeding season census was repeated in this 16 hectare (40 acre) sample of dense interior pedunculate oak-wood (Eastern Wood). The results for 25 years of this census are being summarised.

#### *Scrub and Grassland*

The spring census of the number of territories of singing males was again made on 39 hectares (96 acres) of scrub and grassland in 1974 (G. B. and W. D. Melluish). The number of territories of selected species over the last 11 years is shown in Table 2. Long-tailed tits, wrens and song thrushes have reached their highest level since 1964 and the robin population remains high.

TABLE 2. The number of territories of singing males of selected species in the scrub and grassland in each year.

	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
Pheasant	2	2	3	3	2	7	3	5	7	2	4
Woodpigeon	1	2	4	1	1	6	3	5	7	7	6
Turtle dove	5	4	3	5	3	7	4	8	12	11	10
Green woodpecker	0	1	4	4	4	1	1	1	1	3	1
Long-tailed tit	2	3	4	6	6	6	5	4	6	6	7
Wren	2	3	9	10	15	14	18	14	22	19	23
Song thrush	8	8	7	10	9	9	14	15	13	14	19
Blackbird	15	8	13	17	15	15	20	15	16	16	18
Robin	23	23	15	21	23	23	22	18	21	25	25
Nightingale	0	0	1	2	3	4	5	4	5	3	2
Grasshopper warbler	2	1	6	3	5	6	5	5	4	4	3
Whitethroat	12	17	17	22	16	11	14	12	13	17	13
Willow warbler	20	14	19	27	21	26	14	18	22	20	21
Dunnock	11	15	13	18	12	12	13	10	13	9	14
Linnet	1	4	4	4	1	2	0	1	0	1	1
Redpoll	2	3	5	4	4	6	6	4	4	5	3
Chaffinch	18	13	13	14	9	12	17	11	14	14	15
Yellowhammer	9	7	9	7	8	7	5	8	7	4	5
Reed bunting	3	2	5	6	5	3	3	5	5	4	4

Erratum. There is an error in line 7 of the second paragraph on page 77 in *Lond. Nat.* 53 (1974) which should read ". . . in the case of the blackcap from 1 to 7 territories per 100 acres . . .".

### *Other Notes on the Birds*

The draining of the Isle of Wight Pond in 1973 apparently prevented the little grebe from breeding in that year, but a pair did succeed in nesting in 1974, hatching two young. A flock of up to 26 Canada geese fed regularly in a barley field just north of the Common (ref. 24) for three or four weeks up to 21 September (Nigel Davies). A male mandarin duck was seen on Lower Eastern Pond on 25 May, when there was also a pair of tufted ducks *Aythya fuligula* on the Isle of Wight Pond (Andrew Merritt), apparently the first record of this species for the Common. One or two woodcock were roding in the spring; a nest with four eggs was discovered in Sheepbell Wood (375) on 29 March, but nine days later the eggs were found crushed (L. Baker and J. R. Mullins). A barn owl hunted over Western Plain (468) at 18.45 on 25 October (Nigel Davies). A flock of fifty or more carrion crows assembled at dusk prior to roosting in or near Sheepbell Wood during January and February, and probably also in November. A similar roosting flock had been observed there in August 1966 (K. A. J. Gold).

### **Mammals (G. Beven)**

Six or more rabbits *Oryctolagus cuniculus* (L.) dead or dying of myxomatosis were reported during June and July, and three more in September (E. F. Youngman and Nigel Davies). Even so there are still plenty of rabbits about. Previous epizootics of myxomatosis have occurred in 1954 and 1966. Grey squirrels *Sciurus carolinensis* Gm. remain abundant. A summer nest of a harvest mouse *Micromys minutus* (Pallas) was found 30 cm above ground in grasses on Central Plain (855) on 13 October (Joan Stoddart); harvest mice and their nests had previously been found on Central Plain in 1962 (*Lond. Nat.* 42: 97 (1963)). In January there seemed to be a great increase in foxes *Vulpes vulpes* (L.) (E. F. Youngman). In Central Wood (ref. 543) at 13.30 on 14 May Shirley Coles saw three stoats *Mustela erminea* L. near a rabbit which they apparently killed. A young weasel *Mustela nivalis* L. with one or two adults were seen at ref. 918 on 30 October (Nigel Davies) and a weasel was seen dragging off a rabbit on 14 December (Judy Davies). A roebuck *Capreolus capreolus* (L.) was observed at 18.30 on 14 September on fields to the west of the Common (ref. 47) (Nigel Davies) and deer have been present several times near there during 1974 (Lawrence Smith).

## **Book Review**

*A Key to the British Freshwater Cyclopid and Calanoid Copepods.* By J. P. Harding and W. A. Smith. 56 pages, 16 text figs. Freshwater Biological Association, Ambleside. Scientific Publication 18. 1974. Second edition. £0·40.

This edition differs little from the first which was reviewed in *Lond. Nat.* 40: 137 (1961). An index has been added and some extra advice on how to use the key. These copepods are small crustaceans, whose determination depends on careful mounting on microscope slides and often delicate dissection of the specimen; they have a large number of taxonomically useful characters, but unfortunately many of these are variable within a number of closely related species so that it is not possible to use them in a dichotomous key. Instead the authors have arranged these characters (21 in the case of the Cyclopoids) in tabular form. These tables have an intimidating appearance for the beginner, but if he has done his slide work well and carefully recorded his observations on the various characters, they will be found easy to use.

# The Bryophytes of Bookham Common 1941-1967

Compiled from the Notebooks of the Late C. P. Castell with a  
Contribution from the Late J. H. G. Peterken

by ELLA M. HILLMAN\*

## Summary

From the field notebooks of C. P. Castell alluding to many aspects of natural history on Bookham Common over 26 years, the bryophyte records have been extracted. They were made on 133 days in the period 1941-1967, with a major contribution in 1942-3 by J. H. G. Peterken.

A checklist is compiled of 83 species of mosses and 17 of liverworts (including four incompletely named species) from records within this period, and of others from 1972-3 (R. C. Stern). Their geographical distribution on the Common is given for both periods, and a list of micro-habitats in which they were discovered. Relative extent of distribution can be assessed and has been found to correlate with frequency of records. Relative abundance is not readily deducible as it is not consistently recorded. Only broad comparisons of tolerance for habitats can be made, as these are not always stated. Seven species are listed which stand out as being the commonest, with comparatively high ratings under all headings, except that one is almost confined to trees. There is mention of the effects of war-time activities and of changing climate on the bryophyte habitats.

## Introduction

Many studies of the vegetation and fauna of Bookham Common have now been published. The vegetation studies include a list with their distribution of the flowering plants and ferns, and two accounts of the lichens. The important phylum of Bryophyta is not represented in published work except for an occasional reference in Progress Reports of the survey. It was known, however, that the recording of bryophytes had been carried on from the beginning of the survey, with varying intensity, by the late C. P. Castell, and that he had already indexed many of these records as a prelude to the preparation of data for publication before he was incapacitated by a stroke in 1967, but much remained to be done. Before his death, he had been persuaded to resume this work but physical difficulties were so great that very little further progress was made.

The material necessary for the composition of an account of the bryophytes is contained in three items found in his house after his death: the field notebooks, a boxed collection of specimens, and the partially completed index. The latter has not since been traced, but the first two were in course of time made available to me, and I began by making a fresh index.

It is clear that in the early years of the period 1941-1967 the recording of bryophytes was incidental to other studies. The only systematic attempts at recording were made in the years 1942-1943, mostly by the late J. H. G. Peterken, whose distribution list was copied into the notebooks of C. P. Castell. Shortly before Mr Peterken died, I obtained his permission to quote these records.

## The Records

Some of the names used are now outdated and in this account I refer to the species by the names used in Paton (1965) and Warburg (1963) which are also largely

\* 16 Exford Road, Grove Park, London SE12 9HD.

used in Peterken (1961). To the total of about 900 records the collections alone have contributed 250 which are not matched by a fully named species in the notebooks. In the mosses, the collected specimens contribute 15 extra species to the 68 found in the notebooks, and in liverworts 1 extra species to 16 in the notes. Fourteen of the moss species are not represented in the collections, and 2 of the liverworts. These are marked 'x' in the species list (Table 1).

Some of the notebook records give only the generic name for various reasons; in some cases there is a specimen to complete the record, in others there is no doubt as to the species meant. There is also high probability that *Pleuridium* means *P. acuminatum*, although *P. subulatum* is also present on the Common. *Fontinalis*, *Orthotrichum* and *Lophozia* are recorded once each and so are regarded as represented each by one species. There are six records of *Sphagnum* sp. which I have included in the list, as it appears that they are not of the one named species, and must represent at least one other species of *Sphagnum* (counted as one). There remain 14, of over 900 records, which are named by genus only and which are omitted from this account. In Peterken (1961) four mosses are recorded from Bookham Common which do not appear in the notebooks and their whereabouts on the Common are unknown: *Physcomitrium pyriforme* (1936), *Tetraphis pellucida* (1916), *Pohlia albicans* (1945, very rare in the London Area) and *Pohlia delicatula* (1943); there are four liverworts also, *Calypogeia arguta*, *Plectocolea hyalina* (1947), *Chiloscyphus polyanthus*, and *Cephalozia media*. Two of these bryophytes have recently been found again (see Appendix).

### The Areas

To obtain an estimate of the range of distribution of the bryophytes, the map of the twenty vegetation regions A-T was used (Fig. 1). As this map was not made until 1952 the locations of most of the bryophytes were indicated by the grid prepared by C. P. Castell for general use in recording on the Common. When three-figure references are given it is easy to substitute the appropriate vegetation region, but when two-figure references only occur, a further clue is usually needed: this can often be found in the habitat, aided by the writer's knowledge of the Common for twenty-five years; it has meant that the number of areas assigned by probability rather than certainty is very small. This margin of error, with that caused by the few unnamed species, means that the figures given are approximate, but can reasonably be regarded as a useful guide.

The number of moss species recorded in any one of the vegetation regions lies in the range 16  $\mp$  5, with the exceptions of area N, 46 species; S, 42; T, 33; K, 28; D, 27; A, 26; R, 25; O, 10; and B, 4. It is clear that area B and probably area O are under-recorded, a fact easily attributable to their remote positions on the Common and to the main period in which the work took place, a decade before the vegetation regions were conceived. It is easy to account for the other exceptions which have a larger than average number of moss species. Area N contains the chief ponds and hollows and strips of woodland flanking them; the ditches and streams are found in area S and to a lesser degree in A and R; area K is the lower part of the woods adjacent to N and with Woodland Ditch providing a good habitat; area D is a variety of vegetation types containing the well-recorded Crater Pond. Looking at area T today it would be harder to explain the large number, but in 1940-1950 Eastern Plain (T) was one of the wettest parts of the Common, the only area to include *Sphagnum*; the vegetation then formed a wet heathland community. The changes have often been the subject of comment and were noted by Castell & Jones (1958). Changing climate and to a lesser extent improved drainage have lowered the water-table and altered the plant association to that of dry heathland, and the eight water-filled gun-pits to dry or damp hollows. It may be remarked here that the notes show more instances in the earlier period than in recent years of rain curtailing fieldwork.

Areas richest in liverworts are D, T (7), K, R, S (6), and A (5).

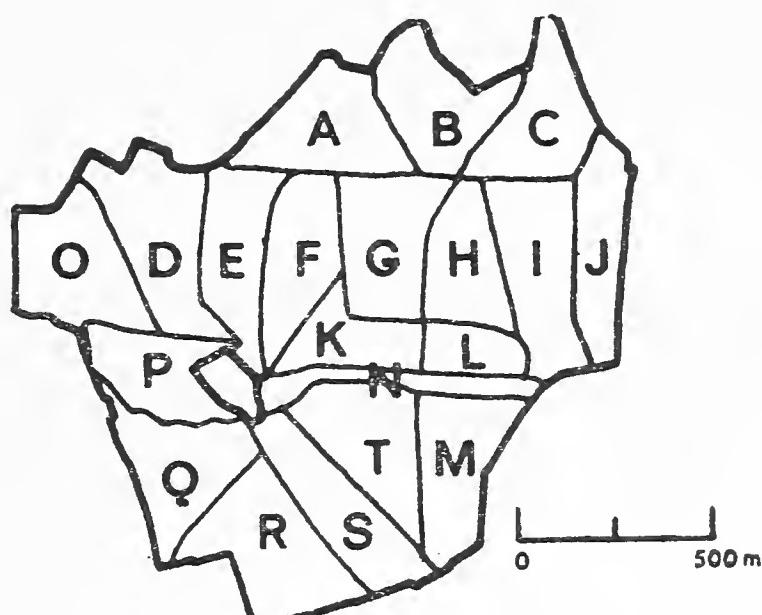


FIG. 1 Key map for areas.

### The Habitats

For brevity, the habitats as they occur in the notes have been numbered and listed as follows:

1. Watery places.
  - 1a. Isle of Wight Pond wall. Since many records are from this location it is given separately. It refers to the embankment at the western end of the pond, which contained some brick and stone work as well as clay. (This has recently been rebuilt as a clay embankment when the pond was cleared.)
  - 1b. Sides of ponds, gun-pits and bomb craters.
  - 1c. Sides of streams and ditches. It is not possible to distinguish vertical and near-horizontal surfaces in these records; on the whole 1c will be vertical and 1b gently sloping, but there will be exceptions.
  - 1d. Marshy areas.
  - 1e. Submerged or floating.
2. Bare ground.
  - 2a. Disturbed ground, ant-hills, mole-hills, rabbit-holes, ruts.
  - 2b. Burnt areas.
  - 2c. Dumped chalk (the only calcareous bare earth).
  - 2d. Loamy soil with open vegetation.
3. Stones and brickwork, mostly that of bridges over water and culverts.
4. Short turf areas, rabbit-grazed.
5. Grassy areas. Plains, and woodland areas cleared of trees, shrubs, and probably of dense herb layer of brambles, etc.
6. Floor of woodland.
  - 6a. Woodland paths, grassy but shaded.
  - 6b. Under trees, on leaf litter or bare ground or with open vegetation. Many entries do not distinguish between these two aspects of the woods, the plain number 6 in the habitat section of the species list shows where these occur. It is possible that ditches are occasionally present.
7. Trees.
  - 7a. Trunks and branches.
  - 7b. Bases of trees. The bases as a rule refer to the lower parts of trunks or roots. "Ground under trees" is included under 6b. In some cases, however, it is suspected that ground close to trees may be meant by the term "bases".

TABLE 1. The bryophytes of Bookham Common. See text for details.

Species	1941-1967		1972-1974		Habitats
	Areas	Habitats	Areas	Habitats	
<i>x Sphagnum</i> sp.	1. T	1cd, 2b	—	—	—
<i>x Sphagnum subsecundum</i> var. <i>auriculatum</i>	2. ST	1b	—	—	—
(Schp.) Lindb.					
<i>Atrichum undulatum</i> (Hedw.) P. Beauv.	16. AC-NRST	1bc, 2ad, 5, 6ab	18. A-FH-KM-T	6ab	—
<i>Polytrichum aloides</i> Hedw.	1. T	1b	—	—	—
<i>x P. piliferum</i> Hedw.	2d. Map ref. 188-9	2ad, 4, 6, 7b	1. O	5	—
<i>P. juniperinum</i> Hedw.	1. D	2ad, 4, 6, 7b	7. ACDEKNT	6ab	—
<i>P. formosum</i> Hedw.	6. DKORST	1b, 2a, 5	9. ABHJKNPRS	1bc, 2a, 6ab	—
<i>Fissidens bryoides</i> Hedw.	10. ACDEGIKLST	1bc, 2a, 5, 6, 8	1. J	2a	—
<i>F. exilis</i> Hedw.	13. ABDEFI-LNRST	2a, 6	5. AHJNO	1bc, 2a, 6ab	—
<i>F. taxifolius</i> Hedw.	3. BKN	1b, 2a, 6, 6b	—	—	—
<i>Pleuridium acuminatum</i> Lindb.	11. BCDFGJKNQRS	1bc, 2ab, 5, 6ab	2. ST	2a	—
<i>x P. subulatum</i> (Hedw.) Lindb.	9. ABDEHKNST	1abc, 2ac, 3, 4, 5, 6	12. CGIJM-T	5. DJNOP	2a, 3
<i>Ceratodon purpureus</i> (Hedw.) Brid.	2. ST	1bc, 2a	4. AKNS	1. N	ib
<i>Pseudephemerum nitidum</i> (Hedw.) Reim.		1bc, 2ab, 5, 6ab, 7b	16. AC-OST	14. ABDEFH-NST	6ab, 7
<i>Dicranella heteromalla</i> (Hedw.) Schp.		3, 7a, 8	14. AC-FI-NRST	16. A-NST	7
<i>Dicranoweisia cirrata</i> (Hedw.) Lindb.	1. P	2a. On mole-hill by shingled house	1. P	1. O	2a
<i>x Dicranum bonjeani</i> De Not.			7. ADFKOST	1. N	6b
<i>D. scoparium</i> Hedw.				1. B	7
<i>D. strictum</i> Schleich ex Schwaeogr.				1. D	5
<i>Campylopus pyriformis</i> (Schultz) Brid.	1. T	—	3. LQT	—	—
<i>C. flexuosus</i> (Hedw.) Brid.	5	—	1. Q	—	5
<i>C. introflexus</i> (Hedw.) Brid.	5	—	7a, 8. On stump and on <i>Salix</i> , Bayfield Pond	—	—
<i>Tortula laevipila</i> (Brid.) Schwaeogr.					
<i>T. muralis</i> Hedw.	5. MNPQS	—		9. DJM-S	3
<i>Pottia truncata</i> (Hedw.) Fürnr.	6. ANOPRS	—		1. P	2a
<i>P. intermedia</i> (Turn.) Fürnr.	1. P	—		2. Map ref. 492	—

Species	1941–1967		1972–1974	
	Areas	Habitats	Areas	Habitats
<i>x P. recta</i> (Sm.) Mitt.	2. NR	1c, 2, 6	—	—
<i>Phascum cuspidatum</i> Hedw.	2. AR	1b, 2a	—	—
<i>Barbula convoluta</i> Hedw.	4. MNPS	2ac, 3	—	—
<i>B. unguiculata</i> Hedw.	3. KPS	1c, 2a, 3, 7b, 8	—	—
<i>B. fallax</i> Hedw.	1. R	2a. Map ref. 8577	—	—
<i>B. recurvirostra</i> (Hedw.) Dix.	—	—	1. T	2a
<i>Grimmia pulvinata</i> (Hedw.) Sm.	2. NS	1a, 3	4. P-S	3
<i>Funaria hygrometrica</i> Hedw.	12. ACH-KMNPRST	1bc, 2abc, 3, 5, 6	5. CENRT	2ab
<i>Physcomitrella patens</i> (Hedw.) B., S. & G.	1. N	1a	1. A	1b
<i>Ephemerum serratum</i> var. <i>minutissimum</i> (Lindb.) Grout	1. S	1b. Map ref. 821. Pit B.	—	—
<i>Tetraphis pellucida</i> Hedw.	—	—	2. AJ	7
<i>Orthodontium lineare</i> Schwaegr.	—	—	3. AKM	7
<i>Pohlia mutans</i> (Hedw.) Lindb.	9. CFJKMNST	1a, 2a, 5, 6, 7b, 8	1. E	5
<i>x P. annotina</i> (Hedw.) Loeske	1. N	1a	—	—
<i>Bryum pallens</i> Sw.	2. NT	lab, 2a	—	—
<i>B. pseudotriquetrum</i> (Hedw.) Schwaegr.	2. DT	1bc	—	—
<i>B. caespiticium</i> Hedw.	3. DNS	1a	—	—
<i>B. argenteum</i> Hedw.	6. M-PRS	1a, 2ac, 3	9. DM-T	2a, 3
<i>B. bicolor</i> Dicks.	7. IKMNOST	1abc, 2ac, 6, 7b	—	—
<i>B. rubens</i> Mitt.	3. PRT	2a	—	—
<i>B. micro-erythrocarpum</i> C. Muell. & Kindb.	2. ST	2a	—	—
<i>B. capillare</i> Hedw.	5. NQ-T	1ab, 2b, 3, 7b, 8	8. ADMNP-S	2a, 3
<i>x Mnium hornum</i> Hedw.	12. ACF-KMNST	1bc, 6b, 7b	13. ABCEH-KMNIPRT	6ab, 7
<i>x M. affine</i> Bland.	2. CQ	6	—	—
<i>M. undulatum</i> Hedw.	3. ADR	2a, 6	4. ADOR	6b
<i>M. punctatum</i> Hedw.	1. A	6	3. ABN	1c
<i>Aulacomnium palustre</i> (Hedw.) Schwaegr.	3. DLT	1cd	1. D	5
<i>A. androgynum</i> (Hedw.) Schwaegr.	2. MQ	8	3. MOP	7

Species	1941-1967		1972-1974	
	Areas	Habitats	Areas	Habitats
<i>Zygodon viridissimum</i> (Dicks.) R. Br.	1. Q	7a. On prostrate trunk over Bayfield Pond	—	—
x <i>Orthotrichum</i> sp.	1. N	7a. Map ref. 586	—	—
<i>Ulota crispa</i> (Hedw.) Brid.	2. AT	le. In culvert, I.O.W.	—	—
x <i>Fonthinalis (antipyretica)</i> Hedw.?	1. N	1b, 6, 8	1. K	6b
<i>Thuidium tamariscinum</i> (Hedw.) B., S. & G.	6. EFKLNT	la	—	—
<i>Cratoneuron filicinum</i> (Hedw.) Spruce.	1. N	1bce, 3, 8	3. ANO	1c, 3
<i>Leptodictyum riparium</i> (Hedw.) Warnst	4. DNPQ	lab, 6, 8	4. AJNT	2a, 3
<i>Amblystegium serpens</i> (Hedw.) B., S. & G.	5. DMNQR	lbc	—	—
<i>Drepanocladus aduncus</i> (Hedw.) Warnst.	3. DNS	lbe	—	—
<i>D. fluitans</i> (Hedw.) Warnst.	5. DHNQS	1abcd, 2a	2. DN	1d, 5
<i>Acrocladium cuspidatum</i> (Hedw.) Lindb.	5. DGNPQ	—	1. N	3
<i>Isothecium myurum</i> Brid.	—	6ab, 7b	2. AN	7
x <i>Camptothecium sericum</i> (Hedw.) Kindb.	3. NRS	1a, 3	5. DPQRS	3
<i>Brachythecium albicans</i> (Hedw.) B., S. & G.	5. DENPS	1abc, 2a	—	—
<i>B. rnitabulum</i> (Hedw.) B., S. & G.	19. AC-T	1abc, 2a, 3, 5, 6, 7b, 8	15. A-HJNOPRST	6ab, 7
<i>B. velutinum</i> (Hedw.) B., S. & G.	6. DKMQRS	1c, 5, 6, 7ab, 8	—	—
<i>B. salebrosum</i> Web. & Mohr.	1. N	1a	—	—
<i>B. populeum</i> (Hedw.) B., S. & G.	2. NT	3. L.E. Pond wall	—	—
<i>Cirriphyllum piliferum</i> (Hedw.) Grout	3. AKL	1b, 6	6	—
<i>Euryhynchium striatum</i> (Hedw.) Schp.	17. AC-GI-NP-T	1bc, 2a, 3, 5, 6, 6b, 7b, 8	18. A-FH-QST	6ab, 7
<i>E. praelongum</i> (Hedw.) Hobk. incl. var.	—	—	—	—
<i>E. stokesii</i> (Turn.) Hobk.	2. KS	3, 6	2. AO	5
<i>E. murale</i> (Hedw.) Mildé	2. MN	2c, 3	—	—
<i>E. confertum</i> (Dicks.) Mildé	5. AFNQR	1b, 6, 7b	5. JNQRS	6b
<i>Rhynchosciagiella tenella</i> (Dicks.) Limpr.	?	6	—	—
<i>R. pumila</i> (Wils.) E. F. Warb.	3. MRS	6	—	—
<i>Pseudoscleropodium purum</i> (Hedw.) Fleisch.	15. AD-HKM-T	1bc, 2ad, 3, 4, 5, 6a, 8	4. DOPR	5

Species	Areas		Habitats		Areas		Habitats	
	1941–1967	1972–1974	1941–1967	1972–1974	1941–1967	1972–1974	1941–1967	1972–1974
<i>Pleurozium schreberi</i> (Brid.) Mitt.	3. HMN	1b, 5			5. ACKNT	—		
<i>Isopterygium elegans</i> (Hook.) Lindb.	2. AK	1bc, 6b, 7b	6		6. ABCJKL	6b, 7		
<i>Plagiothecium undulatum</i> (Hedw.) B., S. & G.	1. A							
<i>P. denticulatum</i> (Hedw.) B., S. & G.	5. ADFKN	1b, 7b	6					
<i>P. syhaticum</i> (Brid.) B., S. & G.	2. DS							
<i>Hypnum cupressiforme</i> Hedw. var. <i>resupinatum</i> (Wils.) Schp.	16. AC–HJ–NQ–T	1ab, 3, 6, 6b, 7ab, 8		17. A–ORT	6b, 7			
var. <i>ericetorum</i> B., S. & G.	4. DFKM	1b, 2a, 6b, 7b						
<i>Rhytidiaadelphus squarrosus</i> (Hedw.) Warnst.	3. EGK	2a, 6b, 7b		1. D	5			
	8. FGHJKNST	1bc, 2a, 5, 6a		1. D	5			
HEPATICAE (Liverworts)								
<i>Lunularia cruciata</i> (L.) Dum.	1. N	3	1. O	1c				
<i>Marchantia polymorpha</i> L.	3. ARS	1b, 2a, 6						
<i>Riccia fluitans</i> L.	5. BCMNQ	1bc						
<i> Riccardia sinuata</i> (Dicks.) Trev.	1. S	1b						
<i>Pellia epiphylla</i> (L.) Corda	4. BDRT	1b, 2a, 6						
<i>Metzgeria furcata</i> (L.) Dum.	1. N	1b						
<i>Fossonbromia pusilla</i> (L.) Dum.	1. T	1b						
<i>F. wondraczekii</i> (Corda) Dum.	1. S	1b						
<i>Calypogeia fissa</i> (L.) Radde	9. DEHIKLNQT	1bc, 2a, 5, 6a	?	2. KT	1bc			
<i>C. trichomanis</i> (L.) Corda emend. Buch.	1. J	—	—	2. HT	1bc			
<i>C. arguta</i> Nees & Mont.								
<i>Lophozia</i> sp.	1. D		2a. Map ref. 465	—				
<i>Lophocolea bidentata</i> (L.) Dum.	10. ABDEFHJKRT	1bc, 5, 8		2. AH	6b			
<i>L. cuspidata</i> (Nees) Limpr.	8. ADKLMRST	1bc, 6, 7b		7. ABCFGKN	7			
<i>L. heterophylla</i> (Schrad.) Dum.	12. AC–GKLMRST	1bc, 6, 6b, 7b, 8		14. BEH–PRST	6b, 7			
<i>Cephalozia bicuspidata</i> (L.) Dum.	3. DKT	1c, 2a, 6		1. T	5			
<i>C. comivens</i> (Dicks.) Lindb.				1. T	5			
<i>Diplophyllum albicans</i> (L.) Dum.				1. N	5			
<i>Radula complanata</i> (L.) Dum.	2. AF	—		1. L	—			
<i>Frullaria dilatata</i> (L.) Dum.	3. FKS	7a						7

8. Rotting wood. "Logs" are included here. In some cases where an epiphytic species is noted the logs may have originated from a recent felling.

Below is given a list of the twenty lettered areas and the habitats within them from which bryophytes were recorded:

A	1bc 6 7	F	6 7ab	K	2a 5 6 7 8	P	1c 2a 3 4 5 8
B	2a	G	1c 6	L	6 7	Q	1d 3 7 8
C	1b 2a 6 7	H	5 6 7b	M	2c 6 7 8	R	2a 3 5 6 7 8
D	1b 2ad 4 6 7	I	5 6	N	1abe 2a 3 4 5 7	S	1e 2ab 3 6 7
E	2a 5 7	J	2a 6 7	O	2a 4	T	1bcd 2ab 5 6 7

### The Bryophytes

Table 1 includes a species list in systematic order of the 83 species of mosses and 17 liverworts, including recent data and some additions by R. C. Stern (see Appendix). The first number after the name is the total of the vegetation regions in which that species occurs, followed by a list of these regions. The last set of numbers are those of the habitats. I have given a map reference or location for those bryophytes for which there is only one record when this is possible and it is not revealed by the habitat.

There are four measures which can be applied to compare the occurrence of the species in a given area: (1) relative abundance (the quantity of each), (2) frequency of occurrence as measured by the number of records, (3) wideness of distribution (called "range" for brevity) and (4) tolerance, measured by the number of different habitats in which each occurs.

(1) In the notes the usual symbols for relative abundance are occasionally used but as this is not done consistently I have omitted such considerations from this account.

(2) The number of records for a species can be taken only as far as the number of days on which it was recorded. One cannot enumerate further, as such entries as "common on trees throughout the wood" cannot be assessed against "recorded from five gun-pits". There were 133 days in the period 1941–1967 on which bryophytes were recorded, and the most frequently occurring species was noted on about one-third of these. This frequency measure, though rather crude, was found to correlate extremely well with (3), the number of areas in which a species was found, so that the latter may be taken as indicative of both its frequency and its range. This implies that the observers covered most of the Common in their search.

The seven most frequently recorded mosses are those found in the greatest number of vegetation divisions, 14 to 19. They are, with the exception of the last one, also found in the largest number of different habitats, and are *Brachythecium rutabulum*, *Eurhynchium praelongum*, *Dicranella heteromalla*, *Atrichum undulatum*, *Hypnum cypresiforme*, *Pseudoscleropodium purum*, and *Dicranoweisia cirrata*. It is to be expected that such tolerant species as the first six would be widely distributed, but *D. cirrata* is found entirely on trees except for one record from roof-tiles. As its (micro-)habitat has an extensive range on the Common, so has the moss. Ranking the mosses in order of their range or frequency, the second group consists of eight species found in 9–13 areas, and the third group of eight species found in 6–8 areas. These, though with the exception of *Ceratodon purpureus* less tolerant than the first group, show little difference from each other in that respect, and this suggests that the more restricted range of the third group may be due to competition between species. There are occasional mentions of the dominance of a species which may be an aggressive one. It must also be remembered that bryophytes are affected by subtle differences of light, temperature and humidity in the same habitat, e.g. the north and south sides of the same tree, and the more sensitive species will not do as well.

The commonest liverworts on the same criteria are *Lophocolea heterophylla*, *L. bidentata*, *Calypogeia fissa* and *Lophocolea cuspidata*, found in 8–12 areas, and

the rest in 1–5. They do not appear to be as widely distributed as many of the mosses though they are often found in association with the commoner species.

If Cyril Castell had been able to write this account he would, I am sure, have done much more justice to his fieldwork and given some information on moss associations and more details of habitat preferences. It is said that he was fond of reading detective stories; he little thought that he was providing work for a sleuth in his field notes. As an example, an entry "Ditch H-G" could not mean a ditch linking those areas as the entry was made a decade before the map of lettered areas was drawn up. A later entry provided the clue—it was a ditch made by the Home Guard. Unless there was a bryologist among them, they can have had no idea, as they constructed it and the gun-pits, that they were providing such good habitats for the bryophytes of Bookham Common. German bombers unwittingly collaborated.

In conclusion, here are a few observations on individual species. The only known location on the Common for *Zygodon viridissimus* and *Tortula laevipila* was a partly alive willow (*Salix fragilis*) with its trunk horizontal over Bayfield Pond. It was recently removed and burnt in a tidying-up operation. *Riccia fluitans* was first recorded covering Sheepbell Pond on 9 May 1954, and in 1959 it also occurred on mud, logs and branches. On 10 September 1961 it had become very scarce, but was still forming large patches on 7 April 1963. On 12 November 1967 there is an entry "No *Riccia* seen". This is the last entry which C. P. Castell made in his field notebook, a few days before the stroke which ended his work in the field.

I am grateful to the two late Presidents of the Society whose meticulous records have made this account possible. J. R. Laundon and A. H. Norkett must also be thanked for some contributions to their records and collections of specimens. I am indebted very much to A. Eddy and Mrs B. J. Ozanne of the Department of Botany, British Museum (Natural History), who obtained the collections temporarily from the National Museum of Wales, where they have recently been housed, and, in order that the data for this paper could be augmented, checked the identification of all the specimens and brought the nomenclature up-to-date. There were over 400 packets. Lastly I should like to thank J. R. Laundon for initiating this action and for helpful suggestions.

#### REFERENCES

- CASTELL, C. P. & JONES, A. W. 1958. The survey of Bookham Common. Notes on the vegetation of Eastern Plain. *Lond. Nat.* 37: 58–65.
- PATON, J. A. 1965. *Census Catalogue of British Hepatics*. Ed. 4. Brit. Bryological Soc.
- PETERKEN, J. H. G. 1961. A hand list of the plants of the London Area. Bryophytes. *Lond. Nat.* 40: 43–71.
- WARBURG, E. F. 1963. *Census Catalogue of British Mosses*. Ed. 3. Brit. Bryological Soc.

#### APPENDIX

#### Bryophytes of Bookham Common 1972–1974

by R. C. STERN\*

In Table 1 is a list of bryophytes recorded on the Common over a period of about 18 months, using the vegetation divisions devised by A. W. Jones and his team for the vascular plant list (Fig. 1).

It is of some interest to compare the mosses in this list with that produced by Miss E. M. Hillman in the same table. A number of species in the earlier list, for which most of the records were 30 years or so old, have not been refound. These include some common mosses such as species of *Barbula* and *Bryum* which have probably been overlooked in the recent survey. However some of the missing species, whose localities were clearly defined, have been carefully searched for without success; these include *Tortula laevipila*, *Zygodon viridissimus*, *Ulota crispa* and *Eurhynchium murale*. Other species have probably disappeared through habitat changes, such as the colonising of heathland in D and T by woody growth which seems to have led to the extinction of *Polytrichum aloides* and *P. piliferum*.

The seven new species include *Tetraphis pellucida*, last noticed on the Common in 1916. Some mosses seem to have increased in distribution, such as *Atrichum*

\* 50 Fordwater Gardens, Yapton, West Sussex.

*undulatum* which is now recorded in 18 of the 20 divisions. The developing oak-woods from the "scrub" areas on Western and Isle of Wight Plains have an interesting moss flora which would repay further study.

Except for *Lophocolea* species, liverworts are not common. Epiphytic species are particularly scarce and are likely to have declined because of increased air pollution in the same way as lichens (see *Lond. Nat.* 52: 82-92 (1973)).

Mr E. C. Wallace visited the Common on two occasions during the period under report and gave considerable assistance in the identification of doubtful specimens.

## Book Review

*The Naturalist in London*. By John A. Burton. 176 pages including 16 pages of plates, 1 map, 2 text figs. David & Charles, Newton Abbot. 1974. £3.50.

A naturalist possessing three of the earlier volumes in the same series\* together with this latest by John A. Burton, will now have a quick and easy reference guide to the natural history of the whole of the southern part of England. *The Naturalist in London* maintains the same high standard of format and production as its predecessors from this publishing house, and will whet the appetite of any newcomer (for whom the author says this book is primarily written) to the area to investigate for himself the many interesting facets described therein. For those already acquainted with some aspects of London's natural history it is, I feel sure, a book of no less value. To have in a single volume short descriptions of the major habitats of the metropolis (from the Royal Parks and outer London heaths and commons to the reservoirs, gravel-pits, sewage-farms and rubbish tips) together with species lists of London's birds, mammals, reptiles and amphibians and a list of central London flora, is a most praiseworthy feature. In spite of the fact that the author states he may have written the book with a "south of the Thames" flavour (being born and having lived most of his life in south London), he has nevertheless given good coverage to such places as Epping Forest (4 pages), Harefield chalkpit (1 page), Rye Meads (3 pages) and several others, all north of the river.

By way of introduction Mr Burton leads us through London's historical growth, its climate and the colonizers (both plant and animal) of its streets and buildings before discussing in more detail the habitats mentioned above. The appendices include lists of natural history societies, brief descriptions of places to visit, and one fascinating item entitled "How to find mammals". In this Mr Burton gives hints on tracking; examining bird pellets for mammal remains; and—what to many of us might seem a less obvious way of recording these creatures—the examination of the interior of discarded bottles!

Very few errors have been detected by the reviewer e.g. on p. 18 the word *right* to denote the position of the photograph should read *below*, and on p. 59 it is not possible to fathom what plant the author really intends for the gobbledegook Latin name *Vitisalix*—but these are of minor significance. One feature that certainly could have been improved is the appendix entitled "Further reading". The space at the end of almost every appendix would have, if utilized, enabled the book-list to have been twice as long and thus much enhanced in value.

The 31 black-and-white photographs (some of better quality than others) together with a map of London's environs (covering almost identical limits to the LNHS survey area) make the book all the more recommendable to our Society's members. Mr Burton has pitched his ecological approach at just about the right level to satisfy most kinds of potential reader.

In all I feel it is a worthwhile book for any London naturalist, whether a temporary visitor or one that is permanently residing but finds he wants to know something of another branch of natural history. And at today's high trend in costs for books such as this, it is fairly moderately priced.

E. W. GROVES

\* *The Naturalist in Devon and Cornwall* by Roger Burrows, *The Naturalist in Central Southern England* by Derrick Knowlton, and *The Naturalist in South-east England* by S. A. Manning.

# A New Map of Bookham Common

by HERBERT A. SANDFORD\*

In 1943 the London Natural History Society published (Castell 1943) an ecological survey base map of Bookham Common drawn by Cyril Castell in 1942. This served as a guide to the countless members visiting the Common and enabled the Ecology Section accurately to locate observations of the flora and fauna. Castell's map proved invaluable to research so varied as to include both the spread of scrub and the distribution of invertebrates (Beven 1968). However, much has changed since 1942. The woodland margin has advanced and many of the paths have been replaced. The Ecology Section therefore decided to revise the base map that had served it so well for some three decades. This revision (see insert) was carried out by too many for all to be mentioned, but the Society is particularly indebted to John Coles, Claire Harding, Ella Hillman, Joan Stoddart, Stanley Thorley and Audrey Warren.

Much of the research carried out at Bookham—probably the longest continuous ecological survey in the country—has concerned changes over time in the distribution of plants and animals. It is therefore essential to accurate comparison for the revised map to continue the grid and divisions of the earlier maps. Cyril Castell (1943) described his grid system as follows: "The area may be considered to be enclosed in a square divided into nine equal areas, each of which is subdivided into nine". This subdivision produces the squares numbered 18 to 94 on the map and these may be further subdivided to give as much precision as is necessary. The method of further subdivision is illustrated in square 31 on the revised map and it can be seen that Bayfield Pond is in square 76 or, more precisely, 765.

In 1953 the Common was divided into 20 regions, lettered A to T, to help in the study of vegetational changes (Jones 1954). These were arbitrary regions bounded by paths and ditches and not intended to have any ecological significance. These regions are shown on the revised map and are separated by dotted lines.

The continued use of Castell's grid (Hillman & Warren 1973) and of Jones' divisions (Laundon 1973) make it necessary to incorporate them into any revised map. Since 1942 however the national grid has come into general use and has become the basis of grid recording for the Society as a whole. The national grid is shown around the margins of the revised map and at the same time provides a scale, each division being 100 metres, one tenth of a kilometre.

The whole of Bookham Common lies within the Ordnance Survey 1:25,000 map sheet TQ 15—the Leatherhead sheet—and is within vice-county 17 (Surrey). It lies in square 15 of the Society's Recording Map (i.e. column 1, row 5) (Sandford 1972).

Much of the Society's recording is now done by noting the presence or absence of a species in each square kilometre or monad. On the revised map these are separated by thin pecked lines. Bookham Common straddles no fewer than seven monads: 15/M16, 15/M25, 15/M26, 15/M27, 15/M35, 15/M36 and 15/M37. Other recording schemes are being conducted on the basis of tetrads, i.e. blocks of four monads (Sandford 1972). Most of Bookham Common lies within tetrad 15/T26 but monads 15/M25 and 15/M35 are in tetrad 15/T24 and monad 15/M16 is in tetrad 15/T06.

The method of using the national grid is explained on Ordnance Survey maps and will not be repeated here. Bayfield Pond has an easting of (5)12·3 kilometres and a northing of (1)55·8 kilometres. Its grid reference is therefore 51/123558. This is called a "six-figure reference". By imagining further divisions one can locate the pond more precisely through using an eight-figure reference 51/12345582.

\* 18 Bicton Close, Leigham, Plymouth, Devonshire PL6 8RN.

From the foregoing it is clear that the method of locating one's observations has changed markedly over the last thirty years but this is a problem we cannot avoid. It is suggested that members of the Society ask recorders, whose names and addresses are in the Society's Programme, which system they should use in giving the location of their observations. Alternatively they could mark the actual location on a copy of the revised map and let the Recorder codify the location.

#### REFERENCES

- BEVEN, G. 1968. A bibliography of the natural history of Bookham Common, Surrey. *Lond. Nat.* **47**: 99-102.
- CASTELL, C. P. 1943. Some preliminary observations on the base map and topography. *Lond. Nat.* **22**: 28-31.
- HILLMAN, E. M. & WARREN, A. 1973. Survey of *Ruscus aculeatus* on Bookham Common: the first two years. *Lond. Nat.* **52**: 93-103.
- LAUNDON, J. R. 1973. Changes in the lichen flora of Bookham Common with increased air pollution and other factors. *Lond. Nat.* **52**: 82-92.
- JONES, A. W. 1954. The flora of Bookham Common. *Lond. Nat.* **33**: 25-47.
- SANDFORD, H. A. 1972. Recording maps and overlays. *Lond. Nat.* **51**: 20-21 with insert in pocket.

# Nature Conservation in London 1974

by KEVIN A. ROBERTS\*

## The London Nature Conservation Committee

London now has a multiplicity of groups concerned with nature conservation, and it is therefore most important that there should be one organisation that can authoritatively represent nature conservation interests in London to outside bodies, and which can offer opportunities for liaison between the various conservation groups in the area. Represented on the London Nature Conservation Committee are all the County Naturalists' Trusts around London, the Nature Conservancy Council, a number of London's local natural history societies and also representatives from various parts of London.

During 1974 over 60 sites and a number of other matters were reported on at committee meetings and this provided an opportunity for all the represented organisations to see what each was doing and how it fitted into the pattern of conservation in London as a whole. The committee is a useful source of contacts, discussion and mutual assistance.

The following sections are by no means a complete summary of conservation activities in London in 1974, but cover most of the matters brought before the committee. The items represent the activities not only of the committee but of all the other organisations represented on it.

## Reserves

New reserves have been established at Firwood and Pondwood, Enfield, and at Bentley Priory. The idea of a nature reserve area at Linder's Field in Essex has been agreed in principle. Perivale Wood, one of Britain's oldest nature reserves, has been declared a statutory local nature reserve by Ealing Borough Council.

## Nature Trails

Nature trail booklets have been published for Wimbledon Common and Mitcham Common. There was an organised nature trail at Nower Wood for a week in July. A booklet on the River Wandle is now available. A nature trail has been prepared for Bedfords Park in Essex. A nature trail at the big new development complex at Thamesmead was officially opened during the year by Dr David Bellamy.

## Conferences

Conferences on the River Thames, canals and the Colne Valley were held during the year and attended by a representative of the committee. A report has now also been published of a conference entitled *Nature in Cities* which is very relevant to London.

## Surveys

A survey of Mitcham Common is in progress. A report on the natural history interest of Fairlop Plain has been submitted to the consultants for the scheme. A report has also been submitted to the Nature Conservancy Council on sites of biological interest along the River Crane and its tributaries. There was a request for a botanical survey from Littleton Sailing Club. A botanical survey of an abandoned railway cutting was carried out for Islington Borough Council. A wood at Streatham was surveyed on request and may be suitable as an educational reserve. The Save the Village Pond campaign has been notified about several ponds in the London Area and attempts are being made to look at these. A number of sites threatened by development were looked at during the year but were considered to be of amenity rather than natural history interest.

## Management

Scrub clearance on Poor's Field in Ruislip is in progress. Scrub has also been cleared from Keston Bog and two small dams have been put in to raise the water level; these measures should help to conserve the interesting flora of the site. Representations are being made concerning the management of heronries at Walthamstow and Kempton Park. Greenhill Meadow has an interesting chalk flora and fauna and the owners have sought advice on the best form of management for preserving the natural history interest. Advice has been given on Old Park in Spelthorne and also on Holland Park.

## Planning Applications

Ruxley Gravel-pits have been under threat of increased pressure from a proposed hypermarket (which has now been rejected), trespass, and now possibly by the decision to reopen a nearby hospital. Part of Staines Moor is threatened by a road scheme. Orlitts Lake may be affected by a proposal for a re-cycling plant close by. An application for housing development at the important Site of Special Scientific Interest at Crofton Heath was rejected after an enquiry, mainly on the basis of the natural history interest. An application to fell an area of woodland which is one of the few remaining sites for the Kentish milkwort was also refused. Croham Hurst, the West Kent Golf Course, Betchworth Quarries, Riddlesdown and Goshill Woods all have at least some natural history interest and are or have been the subject of planning applications in 1974.

## Organisations

The Orpington Field Club now has a conservation sub-committee. The Surrey Naturalists' Trust has recently reorganised its local structure to coincide with the new local government boundaries. The Conservation Corps of the Herts. and Middx. Trust for Nature Conservation is now organised and operational, and the Trust is increasing its general activities in Middlesex. The Brent River and Canal Society has been formed in the face of a planned flood relief scheme for the River Brent and has proposed a linear park.

## The Future

London is an area where land is under extreme pressure and where there is a very large concentration of people. Nature conservation is thus extremely difficult but of potential interest to many more people than would normally be the case. It seems particularly important that the large numbers of school children should have opportunities to observe something other than bricks and mortar. One encouraging sign is that whereas at one stage nature conservation in London appeared to be largely a matter of reading through planning applications and deciding which ones to object to, now at least a portion of the work involves surveys and advice, often sought by local authorities and other organisations in the planning stages of development where it can be given due consideration. Hopefully this trend will continue and grow.

The London Nature Conservation Committee has no paid staff and its officers and members are all extremely busy. Here a mention must be made of the committee's chairman Mrs Pearl Small, who has devoted so much of her time and expertise to nature conservation in London. Time is clearly a great limiting factor on the amount of work that can be carried out. The more people who could help even a little with the paper work, surveys, information on local developments and so on, the more could be achieved.

## Botanical Records for 1974

by J. EDWARD LOUSLEY\*

The botanical records reported during 1974 include many exceptionally interesting reports from south of the Thames, but very many less than usual from the remaining vice-counties. Certainly the increased activity within the London Area in Surrey and Kent owes a great deal to active recording for the mapping scheme and the co-operation of their recorders. A file of detailed, dated, and fully annotated records is essential for the interpretation of distribution maps, especially those of rare or critical species, and those which are increasing or decreasing within the area covered.

We again suffered from the weather. The spring was mainly overcast with less than the average rainfall, so that ephemerals often failed to appear on dry soils. From August onwards there was a lot of rain so species were scarce which appear around ponds as the water-level falls. Throughout the summer there were no periods of exceptional warmth.

This is the first time for well over 20 years that we have been able to report an abundance of soya bean aliens. The only previous occasion was soon after the last war when Soya Food Ltd. was using a small works at Harefield, Middlesex, and many American aliens appeared (*Lond. Nat.* 25: 14 (1946), 26: 76–77 (1947), 27: 41 (1949)). For several years scattered plants of soya bean (*Glycine max* (L.) Merr.), and species likely to have been associated with it, have been turning up on refuse tips in north Kent, but the abundance of this plant in 1974, and a visit by Mr J. R. Palmer to a factory using soya beans, which had many of the associated species growing within its walls, proved the source of these aliens. Some of them are listed below. The appearance of pheasant's eye, *Adonis autumnalis*, in a cornfield, *Leucojum vernum*, several rare grasses, and confirmation of a lot of saltmarsh plants, are amongst other nice records for Kent, while in Surrey B. R. Radcliffe had some excellent records which included some extending the ranges of the often overlooked trees, *Amelanchier lamarckii* and *Prunus serotina*. In Middlesex Mrs A. Warren found that handsome hemp nettle, *Galeopsis speciosa*, at Edmonton.

In this report grid references are given in accordance with the Society's mapping scheme (*Lond. Nat.* 51: 20–21 (1972)). "Tetrad" references are cited as far as possible, and failing this "centrads" i.e. 10 kilometre squares of the national grid. In both cases these appear in brackets following the place names. The nomenclature is based on the *List of British Vascular Plants* (1958) prepared by J. E. Dandy, and for species in that list authors' names are omitted.

### V.C. 16, West Kent

Joan and Peter Hall's records include *Bunias orientalis* from Church Road, Hartley (66TO6), where they have known it since 1971, and from a roadside verge in Hartley (66TO8) where Peter Hall first found it in 1974. He also found *Geranium rotundifolium* in 1972 and 1973 by a footpath which comes out opposite Dartford church (57T42). *Adonis autumnalis* was once fairly frequent as a cornfield weed; now it is very rarely found in such places although we get occasional reports originating from garden plants on refuse tips. R. M. Burton found two plants in October 1974 in barley stubble in a field between Eynsford and Farningham (56T46) where it had probably persisted from the time when cornfield weeds were abundant. He found *Muscaria atlanticum* at Chelsfield above a railway cutting (46T62), scattered along 200 metres of grass.

*Bromus diandrus* Roth is an increasing grass in Britain but our last record from Kent is nearly fifty years old. It was found in 1971 by J. R. Palmer at Skeet Hill (46T84) where *Dianthus armeria* still persists. Mr Burton has drawn our attention to an interesting 1973 record of *Mespilus germanica* from Churchfield Wood, Bexley (57T02) in the *Sidcup & District Natural History Society Annual Report*

\* 7 Penistone Road, Streatham Common, London SW16.

for 1973. This could be a rediscovery of the tree from which the Rev P. H. Cooke collected the specimen in 1937 which is now in the Society's herbarium. Mr Burton has also found—or refound—some interesting plants on Dartford Heath, on ground disturbed by old gravel workings (57T22). These include *Moenchia erecta*, *Trifolium glomeratum*, *T. striatum*, *T. ornithopodioides*, and *Scleranthus annuus*. *Koeleria cristata* is abundant there (57T22 & 57T02) in what Mr Burton suggests may be our only locality on acid soil.

J. R. Palmer has provided most valuable confirmations of the persistance of many maritime or sub-maritime species from Stone, Dartford and Erith Marshes—records for which I have appealed in recent reports. These include *Agropyron pungens* from Erith (57T08) and Erith Marshes (58T00), *Puccinellia pseudodistans* from Erith Marshes (58T00) in abundance, and *Berula erecta* from Stone Marshes (57T64). At Greenhithe, near the river (57T84) he found in 1972 a rare hybrid grass, *Festuca pratensis* x *Lolium multiflorum* (= x *Festulolium braunii*) which has been named by Dr A. Melderis, and in 1974 a large colony of *Vicia bithynica*, and *Catapodium rigidum* subsp. *majus*, specimens of "enormous size" of a subspecies usually found in wetter and milder parts of the British Isles.

Soya bean aliens were found by J. R. Palmer, E. Clement, E. Philp, J. E. Lousley and others on refuse-tips at Stone (57T64), Dartford Marshes (an area made up with sand and shingle behind the sea-wall adjoining a small tip), and Crayford Marshes (57T26). The following are amongst the species found at all or most of these places: *Abutilon theophrasti* Med., *Amaranthus hybridus* L., *Ambrosia artemisiifolia* L., *A. trifida* L., *Echinochloa crus-galli* (L.) Beauv., *Glycine max* (L.) Merr., *Pharbitis hederacea* (L.) Choisy, *P. purpurea* (L.) Voigt, *Polygonum pensylvanicum* L., *Sida spinosa* L., and *Xanthium echinatum* Murr. The refuse tip on Crayford Marshes (57T26) produced for Messrs Palmer, Bull, and Clement the following: *Anoda cristata* (L.) Schl., *Cassia occidentalis* L., *Chenopodium giganteum* Don, *Digitaria sanguinalis* (L.) Scop., *Plantago afra* L., *Solanum rostratum* Dunal, *Trachyspermum ammi* (L.) Sprague, and *Urochloa panicoides* Beauv. *Tragopogon pratensis* L. subsp. *pratensis* is reported by J. R. Palmer from a roadside near Swanley village (57T20). He also found *Cynosurus echinatus* by a footpath near Greenhithe (57T82) and abundant on an embankment of the old Dartford bypass (57T42) and several hawkweeds including the second record for Kent since 1900, det. Dr C. West, of *Hieracium vulgatum*, from a chalkpit south of Stone church (57T64). It should also be put on record that *Calendula arvensis* has escaped from Mr Palmer's garden to the grounds of Horton Kirby paper mill (56T68) where it is now well-established. Mrs M. C. Foster is to be congratulated on her success in growing the *Cassia* seedlings found in 1973, and obtaining flowers and ripe fruits. This has made possible the identification as *C. occidentalis* L. from tropical America and elsewhere; the beans are roasted as a coffee substitute.

One of Mr Burton's nice finds was the hybrid between *Verbascum lychnitis* and *V. thapsus* by the roadside south of Eynsford Station (56T24). This hybrid occurs fairly freely when the two parents grow together, but as they do this so seldom, it is rarely seen. He reports harestail grass, *Lagurus ovatus*, growing in a street pavement near Kent House Station (36T48), *Anthemis arvensis* in front of a school at Eynsford (56T44), but alas, introduced with grass seed and not a corn-field weed, and the handsome *Lychnis coronaria* (L.) Desr. thoroughly naturalised at the top of a railway bank on the south side of Petts Wood (46T48). *Descurainia sophia* was found in 1971 north of Downe, (46T22) by Miss E. M. Hillman and Miss M. E. Kennedy. *Scandix pecten-veneris* is yet another example of the rapid decrease in agricultural weeds; it is not many years since it was quite common and yet Mr Burton tells me that so far he has had only one record for the mapping scheme—a field near Chelsfield Station (46T64) where he found it in 1974 in the same place as a record for 1971. The bog on Keston Common (46T04) is an important habitat but of the bog plants we know from there Mr Burton was unable to refind *Juncus squarrosum*, *Salix repens*, *Carex echinata* and *Eriophorum angustifolium* in 1974; if any member can confirm that any of these are still there we will be pleased to know.

### V.C. 17, Surrey

During 1974 I was heavily engaged in the work of finishing the manuscript of the *Flora of Surrey* which went to the publishers in November. Most of the last fieldwork was on the parts of the county outside the London Area, but fortunately the much greater activity in the work of the Society's mapping scheme produced some useful records which were sent in mainly by Mr B. R. Radcliffe. Under trees on Epsom Downs (25T06) he showed me a large patch of *Duchesnea indica*, which he has known for some years and which is still spreading. This is the Indian strawberry, with yellow petals, and red fruits which are not juicy. *Carex strigosa* he confirmed west of Reigate (25T40) and also west of Wray Common (25T60)—it mainly follows the line of the Gault Clay in this part of Surrey. *Sambucus racemosa*, the red-berried elder, seems to be very rare in Surrey—Mr Radcliffe reports it from the edge of a wood by Fair Lane, Mugswell (25T64). A single plant of *Polystichum aculeatum* on chalk at the edge of a yew wood at Mickleham (15T62), and *Rumex maritimus* on the edge of a water-filled gravel-pit at Redhill (25T80) are new records—the latter is still at the Surrey Naturalists' Trust reserve at Town Pond, Godstone (35T40).

*Oenanthe pimpinelloides* has been known in quantity on Epsom Common (16T80) for several years; Mr Radcliffe has now found two plants well to the south of this in wet scrub (15T88) which suggests that the plant is spreading. Together we found the aggressive water-weed *Lagarosiphon major* in Marbles Pond, Tadworth (25T26) and in the Island Pond in Ashtead Park (15T88); in the latter it had been reported in 1964. With Mrs E. Koh he found *Thalictrum flavum* in marshland near the bridge at Walton-on-Thames (06T86)—strictly V.C. 21. Of *Prunus serotina* Ehrh., of which we had one record, Mr Radcliffe has produced six—from Leatherhead (15T66) four places on Headley Heath (25T02, 15T82, 25T04) and from Banstead Heath (25T24); it has probably been overlooked in many other places. This also applies to *Amelanchier lamarckii* which he found at Oxshott Heath (16T40), Claygate Common (16T62), Headley Heath, and Walton Heath (25T24) where there are at least 24 trees scattered about.

Amongst the Surrey records contributed by Mr Burton is one for *Macleaya cordata* as a large clump established near the Hog's Mill River, Kingston (16T88). This may be the patch discovered by R. C. Wingfield in 1958, when he gave the grid reference as 189687, and an interesting example of the persistence of the species. He also reports *Poa angustifolia* from the down platform at Sydenham Hill Station (37T22).

### V.C. 18, South Essex

Amongst the bird-seed aliens found on a field meeting to the Barking refuse tip was *Ononis baetica* Clemente reported by J. R. Palmer.

### V.C. 21, Middlesex

Mr Kent's *Flora of Middlesex* is now in proof and we hope to see it in 1975. He found a small patch of *Salvia horminooides* near the Thames at Brentford (17T66) and *Silene vulgaris* subsp. *commutata* (Guss.) Hayek on the roadside, Kew Bridge Road, Kew Bridge (17T86). Mrs A Warren found *Galeopsis speciosa* on allotment ground at Edmonton (39T24)—it is very rare in the London Area. A single large plant of *Epipactis helleborine* was found by J. R. Phillips on Harrow Weald Common (19T42). *Echium vulgare*, which is rare in Middlesex, is reported from an old railway marshalling yard at "Feltham (17)" by P. Cribb who has known it there since 1972. Mrs L. M. P. Small was interested in a weed in the *Pelargonium* beds at Mount Vernon Hospital, Northwood (09T62) which is *Polemonium pauciflorum* S. Watson. This is known to stray in gardens and has done so at Kew (*Kew Bull.* 28: 407 (1973)).

No records were received from North Essex, Hertfordshire, or Buckinghamshire during the year.

We are grateful to the following for their contributions to our botanical records during 1974: K. E. Bull, R. M. Burton, P. Cribb, E. J. Clement, Mrs M. C. Foster, Mrs J. Hall, P. C. Hall, Miss E. M. Hillman, Miss M. E. Kennedy, D. H. Kent, Mrs E. Koh, J. E. Lousley, Dr A. Melderis, J. R. Palmer, J. R. Phillips, E. Philp, B. R. Radcliffe, Mrs L. M. P. Small, Mrs A. Warren, and Dr C. West.

## Mammals in the London Area 1974

by K. A. J. GOLD\*

It is gratifying to be able to report that 1974 has been a year of tremendous growth in the interest shown in mammal recording. The total number of observers, although remaining low, has increased by no less than 128%. Coupled with this is an increase in the amount of general interest in mammals as evidenced by letters of enquiry and requests for information. Even more significant is the quality of the records received with many observers having sent not only records but also detailed comments on the relative distributions of species in areas which they visit fairly regularly.

With the exception of the fox the number of records for each species has been maintained or has increased. The significance of the slight decrease in fox numbers is difficult to assess, although P. A. Moxey in Epping Forest noted that the species appeared to be declining in that area. Any other observations regarding the status of this species in other areas would be welcome. In 1974 a single rabbit only was recorded in Bucks. and in Kent only two rabbits were seen from within the Society's Area. Special effort in these areas is needed by observers in 1975.

### Systematic List for 1974

The checklist numbers are from Corbet (1969).

#### INSECTIVORA

1. HEDGEHOG *Echinaceus europaeus* L.

ESSEX. Abridge; Barkingside; Dagenham Park; Epping Forest; High Beach; Hornchurch; Leytonstone; Loughton; Romford; Thorndon Park; Walthamstow.

HERTS. Cheshunt; Colney Heath; Cuffley; Goff's Oak; London Colney; Potters Bar; Sarratt.

INNER LONDON. Kilburn; Regent's Park.

MIDDX. Enfield; Harrow; Trent Park; Woodgrange Park.

SURREY. Esher; Streatham; Sutton; Tadworth.

2. MOLE *Talpa europaea* L.

ESSEX. Epping Forest; Fairmead Bottom; Fiddlers Hamlet; High Beach; Leytonstone; North Ockenden; Rainham Marshes; Theydon Bois; Thorndon Park.

MIDDX. Hampstead Heath; Trent Park.

SURREY. Banstead; Bookham Common; Headley Heath.

3. COMMON SHREW *Sorex araneus* L.

ESSEX. Epping Forest; Fiddlers Hamlet; High Beach; Rainham Marshes.

HERTS. Cheshunt; Cuffley.

MIDDX. Enfield.

SURREY. Banstead Heath; Headley Heath.

4. PYGMY SHREW *Sorex minutus* L.

MIDDX. Heston.

SURREY. Ashtead; Richmond Park.

#### CHIROPTERA

18. NOCTULE *Nyctalus noctula* (Schreber)

HERTS. Barnet.

SURREY. Kew Gardens.

19. PIPISTRELLE *Pipistrellus pipistrellus* (Schreber)

ESSEX. High Beach.

\* 21 Starch House Lane, Barkingside, Essex.

- 21/22. LONG-EARED BAT *Plecotus* sp.

ESSEX. Thorndon Park.

BATS spp.

ESSEX. Epping Forest; Hainault Forest; Hornchurch; South Ockendon; Theydon Bois; Thorndon Park.

HERTS. Broxbourne Gravel-pit; Cheshunt Gravel-pit.

MIDDX. Trent Park; Woodgrange Park.

KENT. Keston Ponds; Westerham.

SURREY. Tadworth.

#### CARNIVORA

24. FOX *Vulpes vulpes* (L.)

ESSEX. Epping Forest; Fiddlers Hamlet; Harrow Lodge Park; High Beach; Hornchurch; Romford; Thorndon Park.

HERTS. Barnet; Cuffley; Radlett.

MIDDX. Brent; Harrow; Kenton; Trent Park.

SURREY. Ashtead; Beddington Sewage Farm; Bookham Common; Esher; Streatham; Tadworth.

27. STOAT *Mustela erminea* L.

ESSEX. Barkingside; Copped Hall; Dagenham Park; Fiddlers Hamlet; Great Myles; Thorndon Park.

HERTS. Cassiobury Park.

MIDDX. Trent Park.

SURREY. Bookham Common.

28. WEASEL *Mustela nivalis* L.

ESSEX. Dagenham Park; Epping Forest; Great Myles; High Beach; Thorndon Park.

MIDDX. Trent Park.

SURREY. Bookham Common.

31. BADGER *Meles meles* (L.)

ESSEX. Epping Forest; Navestock Park; Thorndon Park.

HERTS. Turnford.

SURREY. Headley Warren; Mickleham.

#### ARTIODACTYLA

44. FALLOW DEER *Dama dama* (L.)

ESSEX. Recorded in Epping Forest but reported to be most frequent in the triangle formed by Epping, Harlow and Waltham Abbey; High Beach; Theydon Bois; Thorndon Park.

HERTS. Broxbourne Woods.

45. ROE-DEER *Capreolus capreolus* (L.)

ESSEX. Thorndon Park.

SURREY. Ashtead; Bookham Common.

- 46/47. MUNTJAC *Muntiacus* sp.

ESSEX. Thorndon Park.

HERTS. Wormley.

MIDDX. Trent Park.

DEER spp.

ESSEX. Epping Forest; Fiddlers Hamlet; Navestock Park.

HERTS. Queenswood (North Mymms).

#### LAGOMORPHA

53. BROWN HARE *Lepus capensis* L.

ESSEX. Cranham; Fairlop Gravel-pit; High Beach; Rainham Marshes; Sewardstone.

HERTS. Childwickbury; Redboundbury.

- MIDDX. Trent Park.
- SURREY. Bookham Common; Dawcombe; Epsom.
55. RABBIT *Oryctolagus cuniculus* (L.)  
ESSEX. Barkingside; Coppet Hall; Dagenham Park; Epping Forest; Fairlop; Fiddlers Hamlet; Hainault Forest; High Beach; Hornchurch; Stapleford Abbots; Thorndon Park.
- HERTS. Cheshunt Gravel-pit; Essendon; Goff's Oak; Hatfield; London Colney; Northaw; Panshanger; Turnford; Walthamstow Reservoir; Wormley.
- INNER LONDON. Regent's Park.
- MIDDX. Ealing; Hampstead Heath; Trent Park.
- KENT. Longfield; Stone.
- SURREY. Bookham Common; Esher; Tadworth.

#### RODENTIA

57. GREY SQUIRREL *Sciurus carolinensis* Gmelin  
ESSEX. Epping Forest; Hainault Forest; Highams Park; Loughton; Theydon Bois; Thorndon Park; Upshire.
- HERTS. Barnet; Cheshunt; Chipperfield Common; Cuffley; Essendon; Garston; Hatfield Park; Panshanger; St Albans; Shenley.
- MIDDX. Enfield; Hampstead Heath; Ken Wood; Trent Park.
- SURREY. Ashtead; Bookham Common; Clapham; Esher; Sutton; Tadworth; Tooting Bec Common.
61. HARVEST-MOUSE *Micromys minutus* (Pallas)  
ESSEX. Dagenham Park; Rainham Marsh.
- SURREY. Bookham Common.
62. WOOD-MOUSE *Apodemus sylvaticus* (L.)  
ESSEX. High Beach; Thorndon Park.
- HERTS. Cheshunt.
- MIDDX. Hampstead Heath.
- SURREY. Bookham Common; Esher; Tadworth.
63. YELLOW-NECKED MOUSE *Apodemus flavicollis* (Melchior)  
ESSEX. High Beach.
67. BANK-VOLE *Clethrionomys glareolus* (Schreber)  
ESSEX. High Beach; Sewardstone.
- HERTS. Cheshunt.
- MIDDX. Brent; Trent Park.
- SURREY. Bookham Common; Esher.
68. WATER-VOLE *Arvicola terrestris* (L.)  
ESSEX. Thorndon Park.
- HERTS. Cheshunt Gravel-pit; Kings Langley; Walthamstow Reservoirs.
- SURREY. Esher.
69. FIELD-VOLE *Microtus agrestis* (L.)  
ESSEX. High Beach.
- HERTS. Radlett.
- MIDDX. Brent; Hampstead Heath; Trent Park.
- SURREY. Bookham Common; Esher; Richmond Park.

My thanks go to the following people who have contributed the records contained in this report:  
 T. Allen, E. F. Anderson, Dr G. Beven, J. R. Colclough, J. Cresswell, N. Davies, Miss J. Downie, Miss P. O. Dunkley, R. Eastcott, O. B. J. French, Mrs J. E. Gaffney, Mrs L. E. Gold, Mrs B. Hardwidge, E. C. G. Hardwidge, S. Harris, J. E. Harvey, L. Holyday, R. A. Husband, I. G. Johnson, Miss M. E. Kennedy, R. Leighton, D. Martin, Mrs H. Morris, P. Morrison, P. A. Moxey, A. F. Musselwhite, Mrs B. S. Musselwhite, A. R. J. Paine, R. W. Robinson, Mrs J. E. Small, R. A. Softley, C. L. C. Stephenson, Mrs G. Torrance, I. Torrance, Mrs P. Washer, C. A. White, Miss D. Woods. My apologies to any members inadvertently omitted.

#### REFERENCE

- CORBET, G. B. 1969. *The Identification of British Mammals*. Ed. 2. British Museum (Natural History), London.



## **Statement of Affairs**

## General

Payments						
450	Hire of halls etc. ....	...	...	...	...	324
209	Sectional expenses including LNCC	...	...	...	...	297
54	Subs. to other societies	...	...	...	...	45
117	Printing and stationery	...	...	...	...	49
47	Library	...	...	...	...	31
6	Castell research centre	...	...	...	...	9
265	Honoraria	...	...	...	...	265
110	Postage and telephone	...	...	...	...	123
14	Sundries	...	...	...	...	4
173	Castell bequest expenses	...	...	...	...	55
98	Addressograph machine—repairs and renewal	...	...	...	...	64
48	Cost of services (auditors' fees, bank charges, insurance)	...	...	...	...	112
46	Hindson memorial lecture	...	...	...	...	—
—	Solicitors' fees—Morley College project	...	...	...	...	104
2,093	Grant to publications account	...	...	...	...	4,028
3,730						5,510
Transfer to reserve:						
50	Plant mapping scheme research and publication fund	...	...	...	...	—
3,780						£5,510

## Publications

## Accumulated

Balance at 1 November 1973 (deficit) ...	...	...	...	...	480
Transfer from general account (deficit)	...	...	...	...	1,194
					£1,674

# at 31 October 1974

1973

Assets						
21,931	Quoted investments at cost	...	...	...	...	...
17,028	Bank deposit account	...	...	...	...	...
383	Bank current account	...	...	...	...	...
8,622	United Dominion Trust	...	...	...	...	...
8,646	Central Investment Company	...	...	...	...	...
<b>56,610</b>						<b>21,931</b>
480	Accumulated fund—deficit					18,451
						349
						9,412
						9,615

## Report of the Auditors to the members of the London Natural History Society

We have verified the accounts with the books and records  
of the Society and certify them to be in accordance therewith.

Knightway House,  
20 Soho Square,  
LONDON W1V 6QJ

NORTON KEEN & CO.  
Chartered Accountants

5 December 1974

57,090	£59,758
--------	---------

## Account

Receipts						
2,673	Subscriptions—current	...	...	...	...	2,815
6	arrears	...	...	...	...	26
73	advance	...	...	...	...	82
<b>2,752</b>						<b>2,923</b>
57	Donations	...	...	...	...	72
—	Tax recovered from deeds of covenant	...	...	...	...	145
211	Deposit account interest (National Westminster Bank Ltd.)	...	...	...	...	99
91	Deposit account (Central Investment Co.) excluding premises fund	...	...	...	...	190
78	Sundries including bird film receipts	...	...	...	...	4
—	Dividends	...	...	...	...	660
234	Transfer from premises and equipment fund	...	...	...	...	223
169	Castell bequest	...	...	...	...	—
188	Excess of payments over receipts (transferred to accumulated fund)	...	...	...	...	1,194

3,780	£5,510
-------	--------

## Account

294	Sale of publications	...	...	...	...	...	198
16	Bulletin income	...	...	...	...	...	7
2,093	Transfer from general account	...	...	...	...	...	4,028
74	<i>London Bird Report 36</i> (excess reserve over expenditure) (£750—£676)	...	...	...	...	...	—

2,477	£4,233
-------	--------

## Fund

Transfer from premises and equipment fund	...	...	...	1,674
				£1,674

## Habitat Overlay

by HERBERT A. SANDFORD\*

This is the third in the series of overlays being produced to assist the study of the distribution of plants and animals in the Society's Area. A full description of the scheme appears in *Lond. Nat.* 51: 20-21 (1972). That issue contains a pocket at the back to hold the Annual Rainfall Overlay and others produced later. The Master Grid Overlay appeared with *Lond. Nat.* 52: 155 (1973).

The Habitat Overlay is based with permission upon the Second Land Utilisation Survey. These are being published at the scale of 1:25,000 and a list of available sheets can be obtained from Edward Stanford Ltd., 12 Long Acre, London WC2. Much of the Society's Area is not yet covered by published maps and bona fide research workers may apply to see the original manuscript maps by writing to Miss Alice Coleman, M.A., Department of Geography, King's College, London WC2. Miss Coleman employed a large number of land use categories but these have been reduced to seven in order to produce an overlay more meaningful for the purposes of the Society.

On the Habitat Overlay "wetlands" include fresh and salt-marsh as well as open water. "Woodlands" include coppice but do not differentiate between evergreen and deciduous. "Heathlands" include rough pasture, whether grazed or not, as well as true heath. "Grasslands" include parks as well as meadows. "Farmlands" exclude grazing lands but cover a wide variety of land use: market-gardens, orchards, roots, cereals, fodder, fallow and allotments. The distinction between "settlements with gardens" and "settlements without gardens" was considered important but difficult to make when collecting data. Many tetrads designated as "settlements without gardens" do actually contain small garden plots but are largely built over with closely spaced terraced housing, factories, public buildings, public utilities and the like or else are given over to refuse tips, quarries and pits, transport undertakings and derelict land.

The deficiencies of such a simplified classification of habitats are self-evident. Gravel-pits and chalkpits, for instance, provide strikingly different habitats as do fresh and salt-marshes. The use of a larger number of categories however would have separated out parcels of land so small that they could not have been mapped on the scale adopted for the overlay.

For each tetrad the symbol shows the habitat that occupies the largest area. This is the only way by which to make a tetrad-based habitat overlay. Nevertheless quite frequently the predominant habitat actually occupies less than half the total area of the tetrad. Particularly under-represented are woodlands, wetlands and heathlands as these distinctive habitats are so often restricted to hedgerows, riversides and small commons and gores. An overlay based on monads would have increased detail fourfold and given these habitats a fairer representation, but its use would have been restricted to monad distribution maps. A better solution, should members express a desire for them, would be for the drawing of more specialised habitat overlays, showing particular habitats, such as wetlands, in greater detail.

The full use of the overlays will not become apparent until a more complete series has been produced. A paper illustrating their use will be published in due course but even with the existing material it is possible to illustrate their partial use by reference to the figures in *Lond. Nat.* 50: 96-97 (1972). The Master Grid Overlay shows the bee orchid in tetrad 09/T40 which the Ordnance Survey map shows to be in the Harefield area, a locality strikingly rich in plant species. The

\* 18 Bicton Close, Leigham, Plymouth, Devonshire PL6 8RN.

Annual Rainfall Overlay does not help explain the distribution of this orchid but one would expect that a future soil overlay might. The Canadian fleabane appears to be well distributed in areas of "settlements without gardens" while the lesser celandine seems to avoid such habitats. This is no surprise but there is an advantage in being able to express this difference in a quantitative manner, and in a later paper an attempt will be made to show how it is possible to make useful statements about distributions which are not so easily understood from a mere perusal of the distribution maps.

I should like to express my gratitude to Miss Alice Coleman for her interest and help in producing this overlay, to Mr Percy Deacon for his cartographic assistance and to numerous others who have provided information about changes that have taken place since the time of the Second Land Utilisation Survey.







## Instructions to Contributors

### Submission of papers

Papers relevant to the natural history and archaeology of the London Area should be submitted to the editor, Mr J. R. Laundon, Department of Botany, British Museum (Natural History), Cromwell Road, London SW7 5BD, before the end of January if they are to be considered for publication in the same year. They should be typed, with double spacing and wide (three cm) margins, on one side of the paper. Authors must retain a duplicate copy. Papers should include at the beginning an abstract, summary or synopsis.

### Text

Spellings are to follow *Chambers Twentieth Century Dictionary* 1972 edition; locality spellings should follow the latest editions of the maps published by the Ordnance Survey. Capitalisation should be kept to a minimum. Common names of animals and plants must begin with lower-case initials, and scientific names must be underlined. Genus names should appear in full where first used within each paragraph. In descriptive matter numbers under 10 should be in words, except in a strictly numerical context. Dates should follow the logical sequence of day, month, year (i.e. 25 December 1971). Measurements should be in metric and follow the SI system (Système International d'Unités), with imperial equivalents in parenthesis where appropriate. There should be no full point following Dr, Mr, Mrs or St. Lists should be in natural, alphabetical or numerical order.

### References

Reference citation should be based on the Madison rules (in *Bull. Torrey bot. Club* 22: 130-132 (1895) except that a colon should always precede a page number. Capitalisation in titles of papers in journals should be kept to a minimum. Journal titles should follow the abbreviations in the *World List of Scientific Periodicals* and be underlined. Examples are as follows:

#### In text:

Meadows (1970 : 80). (Meadows 1970).

#### In references:

MEADOWS, B. S. 1970. Observations on the return of fishes to a polluted tributary of the River Thames 1964-9. *Lond. Nat.* 49: 76-81.  
MELLANBY, K. 1970. *Pesticides and Pollution*. Ed. 2. Collins, London.  
WHITE, K. G. 1959. Dimsdale Hall moat, part II. *Trans. a. Rep. N. Staffs. Fld Club* 92: 39-45.

### Illustrations

Distribution maps should be submitted in the form of a Recording Map with symbols in Indian ink or Letraset. Solid dots are used to indicate contemporary or recent presence, circles for old records and crosses (not pluses) for other information, such as introduced species. Tetrad dots and circles should be 4·0 mm and tetrad crosses 5·0 mm, with a line thickness of 0·8 mm; all monad symbols should be 1·6 mm with a line thickness of 0·5 mm. The legend should be written outside the frame of the map and will be set up by the printer. The Mapping Schemes Secretary can provide Recording Maps, advice and dyes for printing distribution symbols.

Line drawings should be in Indian ink on Bristol board, preferably twice the printed size. Place names, etc., must be produced with stencils or Letraset. Legends should be separate as they will be set up by the printer.

Photographs should be glossy black-and-white prints, of good contrast, preferably half-plate in size.

### Proofs

Galley proofs will be sent to authors for scrutiny, but only essential corrections can be made at that stage.

### Reprints

Up to twenty-five free reprints will be supplied on request. Additional copies may be purchased if ordered when the proofs are returned.

# The London Naturalist

No. 54

1975

Officers for 1975	...	...	...	...	...	...	3
Contents	...	...	...	...	...	...	4
Report of the Society for 1974	...	...	...	...	...	...	5
HYATT, KEITH H.—The collections of the Natural History Museum	...	...	...	...	...	...	6-10
HACKETT, K.—Urban street geology in London: three temporary exposures of London Clay	...	...	...	...	...	...	11-14
BRAMWELL, D.—Bird remains from medieval London	...	...	...	...	...	...	15-20
GROVES, ERIC W.—Hemiptera-Heteroptera of the London Area. Part IX	...	...	...	...	...	...	21-34
SOLOMON, D. J. —The decline and reappearance of migratory fish in the tidal Thames, with particular reference to the salmon, <i>Salmo salar</i>	...	...	...	...	...	...	35-37
Survey of Bookham Common: thirty-third year Progress report for 1974	...	...	...	...	...	...	38-48
HILLMAN, ELLA M.—The bryophytes of Bookham Common 1941-1967	...	...	...	...	...	...	49-58
SANDFORD, HERBERT A.—A new map of Bookham Common	...	...	...	...	...	...	59-60
ROBERTS, KEVIN A.—Nature conservation in London 1974	...	...	...	...	...	...	61-62
LOUSLEY, J. EDWARD—Botanical records for 1974	...	...	...	...	...	...	63-65
GOLD, K. A. J. —Mammals in the London Area 1974	...	...	...	...	...	...	66-68
Book reviews	...	...	...	...	...	10, 14, 20, 48, 58	
Statement of affairs at 31 October 1974	...	...	...	...	...	...	70-71
SANDFORD, HERBERT A.—Habitat overlay	...	...	...	...	...	...	72-73







